SCIENTIFIC AMERICAN

A WEEKLY JOURNAL OF PRACTICAL INFORMATION, ART, SCIENCE, MECHANICS, CHEMISTRY, AND MANUFACTURES.

Vol. XVI.---No. 22. [NEW SERIES.] NEW YORK, JUNE 1, 1867. $3 per Annum. [IN ADVANCE.]

Improved Hay Fork and Stacking Apparatus.

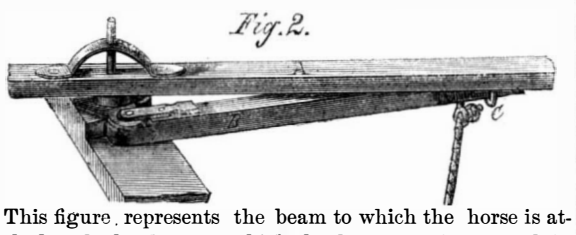
The engravings present views of an exceedingly simple and efficient contrivance for stacking hay, which will commend itself to practical farmers as at once strong, cheap, durable, and portable. When it is to be carried from place to place, the frame containing the axle on which the hoisting and draft ropes are wound is turned over into the inside of the upright frame, as it is hinged to one of the base plates; the horse power frame is placed inside the main frame, on the base plates of which are mortises to receive it, when the whole apparatus becomes rigid and compact. In this condition it can be taken through a nine feet gate. When to be used, the power frame is removed to the position represented in the engraving, sufficiently far from the uprights to give room for the passage of the horse between the two, and the axle frame is turned over, as in the engraving, when both of them are secured by two or three stakes driven into the ground.

The hay to be stacked is placed in the center of the derrick and the stack is built under the projecting bar close up to the derrick. The traveler pulley, which traverses the inclined projecting bar, has a latch attached to the pulley swivel, and while the boy is loading the fork and until it is raised to the required hight, the pulley is held by this latch engaging with a projection on the under side of the inclined bar at the point where the two longest uprights connect with the bar.

On the hoisting rope is a step of leather or any other substance which when it reaches the pulley catch, through a loop of which the rope passes, disengages it and allows the pulley with the loaded fork to travel out on the bar, when the boy can deliver the load at any point desired by the line in his hand.

The axle is of peculiar form, that portion which receives the hoisting rope is a cone while that which receives the draft rope is a cylinder. The reason for this is obvious. In starting a forkfull of hay from the mass not only the weight of the load but the adherance of it to the mass must be overcome, and therefore this conical drum, giving a greater leverage to the horse's exertions, renders this part of the work comparatively easy. The increasing diameter of the cone as the rope is wound on it increases the rapidity of raising the load.

When a forkful has been delivered, the traveling pulley with the fork attached runs rapidly down the incline of the bar and catches the latch, while the fork falls to the hay beneath by its own gravity, without exertion on the part of the boy except to guide it. This gives him the same time to load the fork as the horse occupies in making a half revolution, as only on half the circuit does the horse perform any labor. This may appear improbable, but a brief description of Fig. 2 will explain it.



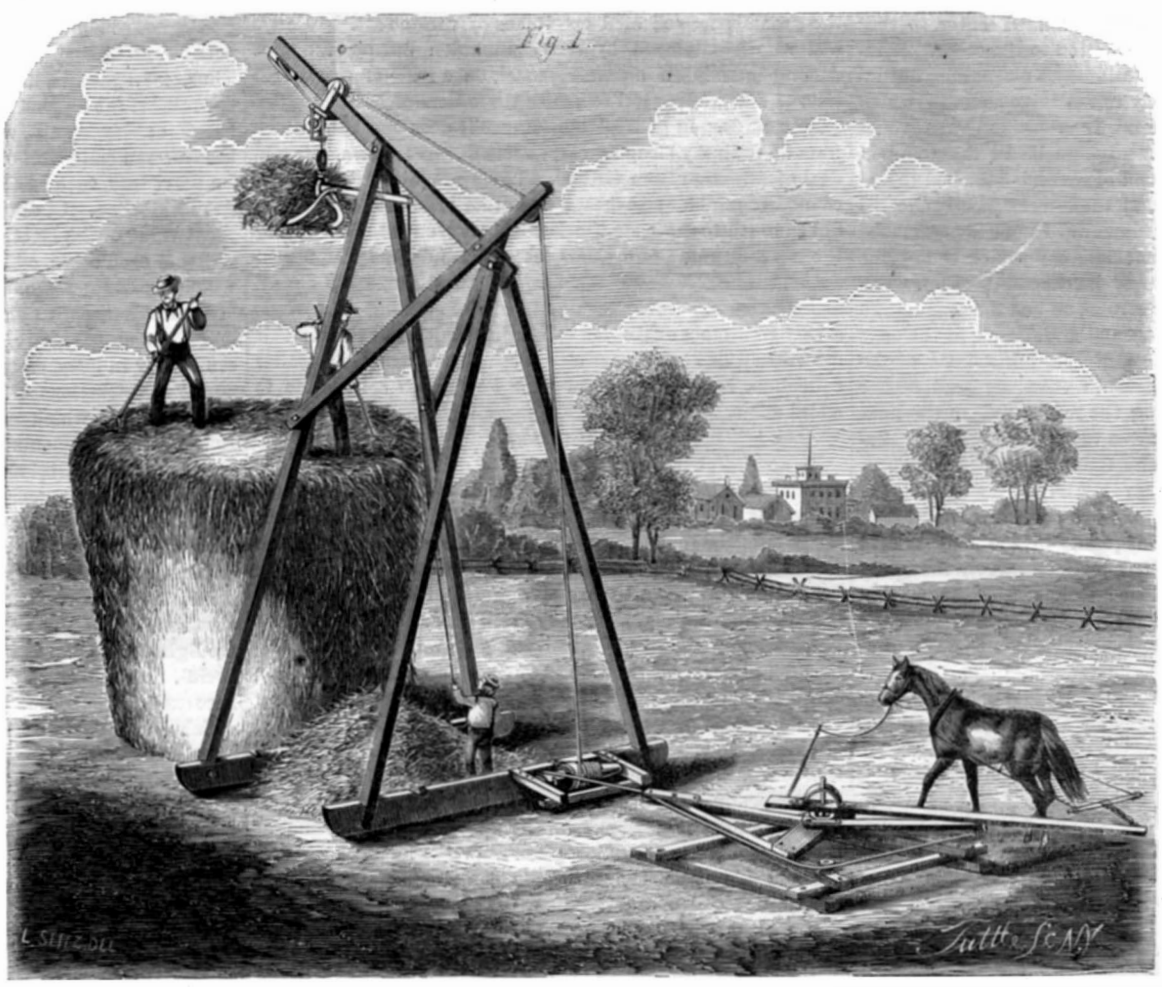
This figure represents the beam to which the horse is attached and the lever to which the draft rope is secured, in combination. It will be seen that the two have different centers or fulcrums. A is the beam and B the rope bar. A projection at C on the beam engages with the bar and carries it around until it arrives at a point when the long end of the beam is furthest from the derrick, when the catch slips off the end of the bar and it is drawn back by the weight of the fork, which unwinds the hoisting rope and winds up the draft rope. In both the engravings the point of release is shown as nearly reached.

The hoisting rope can be attached to any part of the cone drum to regulate the hight of raising the fork, and the stop for unlatching the traveling pulley can be moved to any point desired to accomplish the same result.

By means of the arrangement of the elevating power the horse is not required either to stop, turn around, or back; at each revolution he makes, a forkfull of hay is raised and deposited on the stack. There are no loosening of traces, dragging of single-trees, nor sudden jerks. There is so little time occupied in the descent of the fork that the work can be done more rapidly than when the horse has to back, as in some machines. Thus a small fork can be used and the stack be laid in much better shape than where large masses are elevated at one time. One advantage of having the hay to be elevated under the derrick, is that it prevents topheaviness and obviates the necessity of so heavy a frame, and as the traveling pulley is on the shortest line from derrick to stack, the fork does not need to be guided, but it is essentially self-operating. Soon as the traveling pulley is unlatched the weight of the fork swings it clear of the frame so that the hay is easily discharged. The uprights of the frame are not rigidly bolted, but connected by pivots, so that the base can be extended to admit a load of hay or contracted to pass through an ordinary gate. The elevating power can be readily applied to many uses about the farm other than stacking or loading hay or grain.

The construction of the fork seems to be an improvement on some. Its form is well adapted for retaining the hay, and being of one piece bent to form a loop for the handle, which is strongly braced to the tines, it can be cheaply manufactured.

A patent was issued Aug. 28th, 1866, to Wm. Louden, who has a patent pending for other improvements. Address him for additional particulars or for territorial rights at Fairfield, Iowa.



LOUDEN'S HAY FORK AND STACKING APPARATUS.

How Money Can Be Made.

A correspondent claims that considerable money can be made by inventors who will bring forward improvements which are in urgent demand, and of which the following are a few which are suggested:—A device to admit air and light, while it excludes dust, through window and door openings. It would be well nigh invaluable in every store of fine fabrics in almost every city of the globe. To railroad cars it would add the last and much needed desideratum for that kind of travel, and suppress its most serious nuisance.—A method by which fresh meats can be preserved, similar to canned fruits, and taken to sea. Preserving meats by salting, abstracts a large part of their nutritious qualities.—A noiseless application of power to vehicles, to do away with the over-crowd of horses in the streets of large cities.—A device for heating city railroad cars, omnibusses, etc., other than by stoves. The want of warmth in these vehicles adds largely to the ill health and discomfort of citizens in this latitude.—A compact laundry machine, by which family washing and drying can be accomplished in a small space, without exposure to open air. In yards and enclosures of large cities sun light is generally shut out, and dust abundant.

Synthesis of Organic Compounds.

M. Berthelot pursues the new and wonderful line of achievement opened in the chemical creation of the products of organic life, with unflagging zeal and steady progress. Having heretofore succeeded in forming acetylene by the direct union of carbon (4) and hydrogen (2), he has lately built upon this structure by the addition of oxygen (8) which makes the exact constitution of oxalic acid, and that substance is the actual result. Other carbides of hydrogen are oxidized with the same success, giving a variety of appropriate products. The coal tar products have been proved to consist of a small number of relatively simple bodies, and the great variety of these products to be due to the various combinations which these take on under the influence of heat. In this manner acetylene is artificially condensed into benzine, its equivalents of carbon and hydrogen respectively, being exactly tripled. With an addition of hydrogen under the same influence, it forms ethylene: ethylene with benzine forms styrolene: and again, styrolene with more ethylene gives naphthaline. It is reasonable therefore to conclude that the distillation of coal produces these substances in the same way. M. Berthelot's latest success has been the synthesis of toluene, the base of the new and rich toluen red, which we noted not long since. The composition of this substance (carbon 14, hydrogen 8) indicates the addition of marsh gas (carbon 2, hydrogen 4) to benzine (carbon 12, hydrogen 6) with the elimination of two equivalents of hydrogen. Means adopted to realize this combination, resulted in the successful production of toluen from marsh gas and benzine.

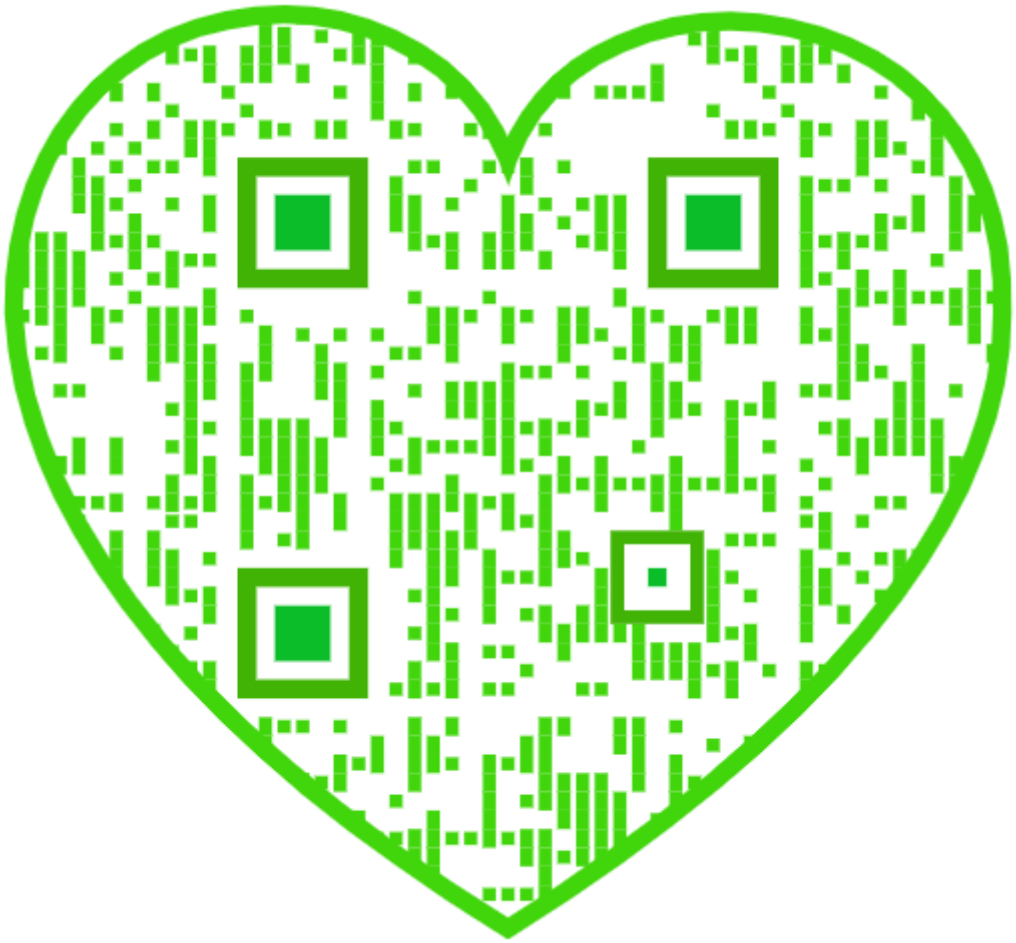
PILLSBURY AND MILLIKEN'S STOVE-PIPE FASTENER.

Where long lengths of stove-pipe are used, it is not uncommon to rivet the joints between the sections to secure rigidity and permanency. But in taking down funnel to clean and in putting it up again, these long sections are unhandy and cumbersome.

The engraving shows a simple means of connecting the sections of pipe and rendering them sufficiently rigid, at the same time that they are capable of being easily separated when desired. A band of sheet iron is beaded at its edges to correspond with the beads on the ends of the sections. It is rolled to fit the exterior of the pipe, and at the two ends are riveted ears, one of which has a threaded hole for the reception of a thumb screw which passes through a hole in the other ear. By unscrewing the screw the band is expanded sufficiently to receive the ends of the sections, and then by screwing up, the annular spaces on the band engage with the beads on the sections and bind the two firmly together. This must be a valuable device for our moving populations, annually cursed by forced re-establishment of their household gods.

It was patented through the Scientific American Patent Agency, May 7, 1867, by O. M. Pillsbury, and D. L. Milliken the latter of whom may be addressed at Brattleboro, Vt.

© 1867 SCIENTIFIC AMERICAN, INC



[From our Foreign Correspondent.]

VARIETIES OF THE EXPOSITION.

PARIS, April 30, 1864.

LOCOMOTIVES.

The collection of locomotives is perhaps the most remarkable feature of the Exhibition, not only from the large number which have been sent, but from the great variety of design which exists among the different engines, some being of the most remarkable construction. Lest your readers, however, should become weary of this one department, I will refer to but one or two engines in this letter, and then pass to the consideration of some of the other objects of interest.

A tank engine from Liege, built by M. Vaissen, is exhibited in the Belgian annex. It has outside cylinders and six coupled wheels of 4 feet 3 inches diameter, and a Bissell bogie with wheels 2 feet 7½ inches diameter. The fixed center of the radial arm of the bogie is directly under the buffer beam, instead of back of the truck. The cylinders are placed just over the forward wheels of the bogie, and therefore are considerably inclined. The steam chests are on top of the cylinders, and the valve gear employed is that known in Belgium as Walschaert's. Instead of the usual eccentrics a single return crank is employed, set exactly at right angles to the main crank, and the motion obtained from this is communicated to one end of a curved link vibrating on a fixed center, so that one end has exactly the opposite motion to the other. A radius rod works in this as in a stationary link motion, but instead of being connected directly to the valve stem, in which case, from the position of the return crank, the valve could have no lead, it is connected a few inches below this to a vertical vibrating arm, the upper end of which is attached to and supported by the valve stem, and the lower end is connected by a link to an arm projecting downward from the crosshead of the piston rod. This intermediate connection causes the valve to be in advance or arrear of its central position when the piston is at each end of its stroke, and as the inclination of this intermediate lever will always be the same at the ends of the stroke, in whatever portion of the link the end of the radius rod may be situated, it follows that the lead of the valve will be varied by shifting the radius rod in the link. This arrangement therefore gives a variable cut-off, very similar to that of a link motion with constant lead. As the motion of the valve is in a measure controlled by that of the piston, instead of that of the crank as in the case of any eccentric valve gear, the ordinary inequality in the cut-off is to some extent avoided, though not more effectively than may be done by a properly proportioned link motion, and it has the disadvantage of a greater complexity of parts than the latter gear. It is, however, used to some extent on the continent. The draw bar of this engine instead of being fastened beneath the foot plate, is carried forward to a point near the forward pair of coupled wheels, and is allowed to vibrate laterally where it passes out beneath the foot plate. As it is necessary to bend this bar downward beneath the engine, the curved portion is forged in the form of a truss to give the requisite stiffness. The after pair of wheels is situated beneath the fire box, which is shallow enough to admit of this arrangement.

The English locomotives, though presenting little that is novel in design, correctly represent the excellent workmanship and simplicity of construction of the British makers. After examining the often extravagant machines of many of the continental builders, one returns with pleasure to these beautiful examples of sound mechanical ideas. The same encomium is due to the American engine also, which can not fail to be admired for the accessibility of its parts, and the direct manner in which all the strains are transmitted and sustained.

ENGLISH POSTAL CARS—CATCHING AND DROPPING THE MAILS.

In the English department is exhibited a very interesting collection of objects illustrative of the working of the post-office in that country. Among these is a beautifully executed model of a traveling post-office, representing in detail all the fittings with which these are furnished. It consists of three vans coupled closely together, and having a leather connection between them, giving a free passage way from one to another. The two end vans are furnished with boxes for assorting the letters, as mentioned in my letter some weeks since describing the general working of this system: one being for the through mails and the other for letters between intermediate stations. The middle van is used for catching and delivering the mails and also contains the bags for the large cities, Liverpool, Manchester, etc. The apparatus for receiving the mails when the train is in motion at full speed consists of a frame work of iron outside of a window of the apparatus van, carrying a stout network of leather forming the bottom, sides and one end of a strong but yielding receptacle. Diagonally across the top of this are drawn two stout cords united in the middle. By the side of the road are erected iron posts with overhanging tops reaching to just the proper distance from the train, and on this, by means of a simple spring catch, are hung the mail bags. These are suspended in such a manner that as the train passes by the long coupling by which the bag is attached to the posts is caught in the V-shaped loop formed by the diagonal cords just mentioned, and jerked away from the post, the bag being caught immediately in the network receptacle, whence it is taken through the window into the van. The mails are deposited in a similar manner, being hung for this purpose on a jointed arm on the side of the van, a counter-weight being attached by a cord to the arm, so that as soon as the weight of the bag is removed the arm flies up against the side of the van and is out of the way. The use of this apparatus enables mails to be taken up and deposited at all the towns along the route without slackening the speed at all, and without risk of accident.

The various stamps used for marking the date and name of the office on letters, and for canceling the postage stamp, are also shown. One of these is a self-inking machine with separate dies for canceling and dating, so that the latter is always legible. I think it worth while to remark here the fact that on English letters the postmark is always perfectly distinct and legible, while as we all know on our letters it is very often impossible to make out the name of the place from which the letter has been forwarded, or the date, both of which are sometimes matters of considerable importance. The whole secret of this appears to be that the English dies are small, say three quarters of an inch in diameter, and the letters and figures are cut with as thin lines as possible: ours on the other hand are so large that if one side bears hard in striking the letter the other will not touch it, and the letters are so full faced as always to be blurred. In addition to this they exhibit a set of books showing the forms of receipts for registered letters, the manner of assorting the letters into classes at the London Post-Office, together with examples of the tables and taxes used in the operation.

AMERICAN SANITARY COMMISSION.

A very interesting exhibition is that of the United States Sanitary Commission. In one of the numerous buildings in the grounds are collected specimens of various articles, large and small, employed by the commission during the war. Among these is an accurate model, on a scale of one fourth size, of a large hospital car, with three tiers of beds, hung on rubber rings. In general appearance it does not differ much from an ordinary sleeping car, and it seems to attract a good deal of attention from visitors. There are also specimens of canned vegetables and meats, and other articles of diet which did so much to mitigate the hardships of our soldiers during the war. Then there examples of ambulances of different forms, surgical instruments, hospital furniture, camp chests, and cooking apparatus, besides articles of clothing—the whole a very creditable exhibition of our ingenuity and skill in this direction. The French are also preparing a somewhat similar collection, but it is not yet near enough to completion to afford subject for remark.

MILITARY.

In another building is a display of guns and armor plate, all English, I believe, except a case of revolvers from Colt's factory at Hartford. An Armstrong 9-inch muzzle loader weighing 27,957 lbs. is mounted on its carriage behind a wooden shield representing the side of an iron-clad broadside vessel. Mr. Whitworth has five guns of smaller size, unmounted, but representing very well his system of construction Then there is a 9-inch rifled gun made on Major Palliser's principle at Sir Wm. Armstrong's works. He uses a coiled tube for the bore and pours around this a thick casing of cast iron, in shape somewhat like our guns. The weight of this is 30,009 lbs. A 20-inch or even a 15-inch gun from the United States would have been an interesting addition to this collection, but our system of cast-iron ordnance is not represented in the exhibition. Messrs. John Brown & Co. exhibit several specimens of armor plate from 13½ inches thickness down to 4 inches. The largest is a plate 6 inches thick, 42 inches wide and over 30 feet long, weighing 11 tuns, 5 cwt. With this are exhibited shavings planed off from the edges of the plate, showing the toughness of the iron. The same makers also exhibit some large steel gun barrels forged hollow on Deakin & Johnson's patent, with which your readers are already familiar. The largest is about 13 inches in diameter, the central hole being about 6½ inches, left as forged, and the length is 10 feet.

SLADE.

TRIAL OF STEAM FIRE ENGINES.

The Engineer, under date of April 26th, says:—

"A trial of the steam fire engines in the Exhibition took place in the Champ de Mars on Tuesday and Wednesday last. The following were the exact times made:—Shand & Mason: 20 lb. steam in ten min.; 49 lb. in 13 min.; 60 lb. in 14½ min.; started. Merryweather's; 20 lb. in 9½ min.; 60 lb. in 11 min.; 80 lb. in 12½ min.; and started, rising steadily afterwards to 150 lb. The hight of both jets at full power was about 120ft., as observed on the Great Lighthouse, beside which the trial took place. Inch jets were used by both engines. In the evening Shand & Mason's large engine, Le Rhone, was tested against the French one made at the 'Ocèan' workshops, Havre, on Lee & Larned's (American) system. The latter altogether failed to keep steam, and was never able to pump with more than 1¼ in. jet, whilst the Rhone's two jets of the same diameter always surpassed it in hight. On Wednesday the French engine was again at work beside the river, and apparently getting on much better than the day before, but it did not venture to place itself beside Messrs. Merryweather's large double-cylinder, l'Empereur, which for some hours continued to throw a 1¾in. jet up to and even 10ft. over the gallery of the Great Lighthouse. The hight thus attained was from 170ft. to 180ft.

The *Mechanics' Magazine* says:

The trials were made and strictly conducted by the jury of class fifty-three, and they principally rested with the engines of Messrs. Merryweather & Sons and those of Messrs. Shand & Mason; for, although there was another engine present, made by M. Mazaline, of Havre, on the duplex system of Lea & Larned, of New York, for some reason unassigned, but little work was got from it. The three steam fire engines exhibited by Messrs. Merryweather have horizontal cylinders and pumps, two being single and having 18in. stroke of piston, and the other double cylinder with 24in. stroke of piston, made on the makers' well known system, without cranks eccentrics, or flywheels. The two engines of Messrs. Shand & Mason were a vertical and a double and horizontal engine, both with cranks and flywheels. The boilers of Messrs. Merryweather's engines are constructed on the well-known "Field" principle. Messrs Shand & Mason's large engine was set to work, but from some unexplained cause did not act as well as was expected. Messrs. Merryweather's large engine, which had at mid-day just arrived from Billancourt, where it had been taken through some blundering of the railway company, was not in time to be worked. It will probably be tried in a day or two. Besides the jurors, there were present Prince Napoleon, the Colonel of the Sappeurs Pompiers of Paris, and several other influential and scientific gentlemen. Since writing the above report we have received the following telegram:—"April 24, Merryweather's large steam fire-engine, 'L'Empereur,' worked alone to-day. Threw water 220ft. high; jury delighted."

CONTRASTS OF THE AMERICAN DEPARTMENT, ETC.

The Paris correspondent of the New York *Times*, April 26, thus refers to American topics at the Exibition;—

"The most prominent thought in one's mind as he passes through this Exhibition, is that everybody should know so much. Each nation must be astonished at the knowledge of the other. An inventor puts up a machine at great cost, and when he walks into the division of another nation across the aisle, he finds a better invention for the same purpose. Certain nations at great expense have sent whole categories of goods, not to show the progress they have made, but to compete for premiums, and their collections are miserable failures. Thus, for example, the Germans have had the courage and the misfortune to send to the Exhibition a considerable number of carriages; and when one passes from the French into the German collection of vehicles, it is like passing into a *salon des refusés*, such as the French used to have at their annual Art Exhibition. Of course, in these striking contrasts lie the great value of the Exhibition, for by them workmen learn to estimate each other, and to measure the distance in perfection which separates them.

A circumstance which has not been remarked upon, because it happened naturally and without pre-arrangement, is the conformity in form, color and costliness of the different temporary constructions of the Exhibition to the characteristics of the nation which put them up. Thus the English and American departments are plain in form, with no surplus decorations, and absolutely without method as to color. Their departments correspond more nearly to the Exhibition building itself than the others, because it is the nut and not the envelope they look after. The French section is both showy and solid, and especially in good taste.

But the most remarkable differences are to be seen in the constructions of the Park. There the French constructions are light, graceful and inviting; the English heavy, solid and useful, and not at all decorative. The African and Oriental here excel; the nations which never invented anything useful, which do not exhibit a single idea in the way of human progress, excel in their exhibition of mosques, and temples, and gentlemen's country houses.

The American department, which is the poorest looking in the Exhibition, because of all absence of display, and because the articles exhibited are all practical; this department, which some of our own country people have stigmatized as a failure and as a disgraceful exhibition of national inferiority, is just now the most frequented and the most talked about, because we already know what are to be the verdicts of the juries, and these verdicts are in favor of American exhibitors. For example, to the surprise and the shame and the horror of all Paris, the unartistic savages of the New World will take the Grand Medal for musical instruments, in the person of Mr. Steinway, of New York City—an event which has astonished the Parisians more than if the Prussians were to march up the Boulevard this afternoon, with Bismarck at their head! So, too, the American brass musical instruments, on account of their revolving "hair-trigger" valves, will also take the principal prize in their department. And yet the Americans show but half a dozen pianos against several hundred out of the best shops of Europe, and but half a dozen brass wind instruments against several ship loads from other nations! And so on of many other things.

By the first of May the Exhibition will be completed; all the boxes will be opened, all the goods put in place, and the last of the dirt cleared away. Last Sunday 48,000 persons were admitted at a franc a head, and the day after 68,000. Thus the Exhibition made in two days $28,000. But these were *fête* days, and consequently exceptional days. Nevertheless there are many other days to come when the receipts will be equally large.

Exposition Notes.

THE FIRST EXPOSITION was made under Nero, more than 18 centuries ago, and is referred to in a letter by Seneca, as "a solemn exhibition of the riches of Rome," containing miscellaneous works of art, and exquisite fabrics even from beyond the limits of the Roman Empire.

A CHIME of 42 bells, to be placed in the Exposition, is played like a pianoforte with perfect ease, to any tune. Four years were spent in the construction of the instrument.

THE STEEL BRIDGE of the Quay D'Orsay, near the Exposition building,—the first of the kind yet built—is said to be a failure, having already sustained a deflection of at least three inches in the center.

OPERATIVE'S TENEMENTS are exhibited on four different plans, from as many as four different seats of French industry. M. Jean Dollfus, the philanthropic cotton-spinner of Mulhouse, exhibits a block of four costing about $545 each; the Blanzy Coal Mines, a style costing $485, of which they have built 679 and their miners themselves, 99. The Co-operative Society, a style costing $582: and Messrs. Japy Freres of

© 1867 SCIENTIFIC AMERICAN, INC

Beaucort, Alsace, makers of clocks, watches, sewing machines and other small wares, exhibit what is spoken of as the best house in the lot, though costing only $388, and allowed to become the property of the tenant at the end of eleven years, by the weekly payment of about $3.90.

HOWARD'S TRACTION ENGINES.—J. Howard & Co's traction engine for agricultural purposes and double plowing, exhibited at Paris, is an exceedingly substantial machine. The boiler is placed transversely, the better to keep the fire and water level while going up and down hill. The barrel of the boiler is 6 feet long by 3 feet 4½ inches in diameter, the two cylinders are 8 inches diameter and 12 inches stroke, and the crank shaft is 3¼ inches diameter. The foot plate is very roomy, measuring 5x3½ feet. The test of every machine before sending it out, is to drive it repeatedly at full speed over large logs, 8 or 10 inches square, in a graveled yard. The engine will turn completely around in little more than its length, which is 19¼ feet over all, will haul a load of from 20 to 30 tuns on a good road, and will ascend an incline of one foot in six with ease.

THE EXPOSITION PALACE has been insured by the Imperial Commissioners in the International Assurance Company for the sum of seven and a half million francs.

Editorial Summary.

COLORING OF ZINC PLATES.—A variety of beautiful colors, corresponding to those of the rainbow, can be imparted to zinc surfaces, by a simple chemical application continued a length of time proper for the desired color. It is necessary that the metal be pure, and especially free from lead. It is therefore to be rubbed with siliceous sand moistened with hydrochloric acid, then dipped in water and rubbed vigorously with blotting paper. The zinc is then immersed in a solution of three parts by weight of dry tartrate of copper in four parts caustic soda, with forty-eight parts distilled water, the whole at a temperature of about 50° Fah. The colors will appear successively, in the prismatic order, according to the period of immersion. In two minutes, the violet will appear; in three, dark blue; in four and a half a golden yellow; in eight and a half a red purple. Intermediate terms give intermediate tints. When colored, the zinc is well washed with water, and for greater permanence of color may be varnished.

DARNING MACHINE.—It would be singular if the first darning machine should be an English invention, but it will be more singular if some Yankee does not take up the idea and improve upon it. The method recently patented by Mr. E. A. Cowper of London, consists substantially in the use of a small rectangular frame, large enough to enclose any hole to be darned, and notched all around its outside like a saw, upon which darning cotton is wound in two directions crossing each other, one thread in each notch, and thus at uniform intervals. The network thus formed is applied to the hole, the article is stretched upon the frame and held by its teeth, and then the apparatus is placed beneath the needle of a sewing machine adapted to make stitches enveloping and clasping the threads at their intersections, and filling the space with a firm and neat texture. When done, the frame is cut away and the ends of yarn trimmed close with the scissors.

ANOTHER MODE OF TANNING.—The hides are suspended vertically, in alternation with cloths, in a vat filled with the tanning liquor and containing something like false sides which are made to approach each other (after the skins are soaked) so as to squeeze out of them the spent liquor which has already given its tannic acid to the gelatine of the hide. By the removal of the pressure, fresh liquor is admitted to the pack, absorbed, exhausted of tannin, and again expelled by the press: the operation being repeated until the hides are entirely converted to leather, which is accomplished in a week or ten days. Calfskins are suspended to the spokes of a horizontal wheel, revolving in a tub of liquor, and sweeping them through it, broadside on, so as to produce the rapid exchange of exhausted for fresh liquor which is desired. The lightest skins are thus tanned in 12 to 24 hours; others in two to four days.

TRICHINÆ.—It did not occur to us as necessary to remark—what the inquiry of a subscriber requires in reply—that trichinized pork is supposed to be rendered harmless by being thoroughly cooked. Eating it in that condition becomes a mere matter of taste—not of life and death. But it is never safe to eat pork, no matter how thoroughly salted, pickled or smoked, unless it is thoroughly cooked, leaving no spot "rare." The best looking pork has proved trichinous; and if salted, pickled or smoked, the raw color and taste by which we usually detect imperfectly cooked meat are so much disguised that only extreme care on the part of the cook can be a protection, unless we take security by rejecting all ham, bacon etc., that is not *over*done.

CHINA.—The telegraph and express line is now open from London to Tien-tsin (the port of Pekin) dispatches passing in twelve days. The Chinamen don't telegraph much yet, however, and they are bitterly opposed to railroads as well. The enterprising gentleman who has for two years expended so much effort to introduce the telegraph, has given it up in despair of any efficient protection to the lines against the hostile prejudice and perfect thievishness of the dense and densely ignorant population. He has gone, we believe, to Japan, with much fairer prospects of success. Arrangements have indeed been already made to lay a submarine cable between Yeddo and Yokohama, and land lines to the interior will follow.

THE CONVERTIBILITY OF ELECTRICITY AND HEAT is illustrated by joining a bar of antimony and another of bismuth, end to end, and passing a current of electricity through them, first from the one end and then from the other. The current passing from the antimony to the bismuth will be found, by proper tests, to part with a portion of its electrical intensity at the junction, and to develope increased heat. That passing from the bismuth, on the contrary, will manifest increased electrical tension, evidently at the expense of the pre-existing heat, for the bar at that point will be colder than before the current passed. The same principle has been applied by General Morin, so as to produce a self-registering electrical thermometer. A thermo-electric battery—developing electricity by the application of heat—is arranged with one extremity of the pile in a medium of uniform and low temperature (ice) and the other in the medium the temperature of which is to be measured. A needle is magnetized by the thermo-electric current produced by this temperature, and its consequent deflection from a certain natural position is registered by punctures made by it in a dial of paper which is caused by clock work to complete a revolution in twenty-four hours, and also to rise to meet the puncturing point at equal intervals, hours, half hours, etc., as may be desired. The punctures made at the several hours will indicate by their variation from a circle, the changes of temperature throughout the day.

A NEW MARINE VOLCANO is reported near Navigator's Isles, inaugurated with a violent earthquake shock on the 5th of September last, after which dense smoke and lava were thrown up from the ocean in vast quantities, and continued without abatement when heard from about the middle of November. It has been impossible, of course, to approach or examine the forming island, and probably will be so for some time to come, as a vast volume of stifling smoke and steam and a turbulent sea extend to a great distance around. If the demonstration "succeeds," a new volcanic island will be talked of in future geographies, and ages hence may be a green and smiling abode of men.

CHARCOAL.—The interesting mystery of the power of charcoal to absorb, condense and change gases to vapors, engages continued investigation. Among the latest observations reported, the remarkable chemical activity in charcoal saturated with oxygen is displayed in the conversion of moist sulphurous acid and sulphuretted hydrogen to sulphuric acid; common alcohol to acetic acid, and amylic alcohol to valerianic acid; indicating a power of oxidation extending to a very wide range of effects, but to which ammonia showed an exception. The condition in which oxygen exists so largely and actively in charcoal is yet a mystery.

THE LYCEUM OF NATURAL HISTORY of Williams College, is fitting out an expedition to visit South America, with the intention of making a special study of the volcanic region about Quito. The company is composed of twelve select members of the Society and is under the charge of Professor Jas. Orton, a graduate of Williams College, but now of the University of Rochester. The proposed route is from this city, *via* Panama to Gauyaquil, thence to Quito. Upon finishing their exploration in Ecuador their present plan is to proceed to Peru and descend the Amazon. The estimated expense is $15,000 which will be defrayed by the friends of the College.

LUCINE OR GLUTEN FOR FASTENING COLORS, as a substitute for whites of eggs, is dissolved in alkaline or acid solutions. The best acid is acetic; the best alkali, lime dissolved in sugared water or ammonia. The difficulty is to get a sufficient proportion of the gluten incorporated with the coloring matter. To effect this, soaked gluten is mixed with ammonia or exposed to its vapor, and after a few days will liquefy and assume the consistence of a good thickener of colors. With ammonia and sucrate of lime, the compound becomes capable of resisting soap.

WHITWORTH'S NEW CARTRIDGE.—Mr. Whitworth's improvement lately patented, consists in a cylindrical space formed by a thin perforated copper tube running lengthwise through the cartridge, and containing a priming by which the powder is fired, either at the end or by a branch tube near the center. The length of the cartridge of a given weight is thus increased, giving a large bearing surface and distributing the strain. The powder is also ignited more nearly simultaneously and instantaneously, and the explosion of the priming itself gives the initial start to the shot.

SWEDISH GREAT CAST GUNS.—A large rifle gun of twenty tuns, 10·58 inches caliber, has been cast for the Danish Government at the Finspong gun foundery in Sweden, and tested with 234 heavy charges, with the most satisfactory results as to accuracy and endurance. The charges used were from 44 to 55 pounds of powder and from 450 to 468 lb. shells. The breech is strengthened externally with two concentric layers of French puddled steel coils, shrunk on, and extending a little forward of the trunions which form part of them.

A BEAUTIFUL NEW PORCELAIN GLAZE.—A double chloride of platinum and aluminium, obtained by dissolving the metals together in *aqua regia* (nitro-muriatic acid) is mixed with fine ground Limoges glaze, (a potash-alumina glass) as well as with other enamels, producing a variety of beautiful effects. The first named gives a remarkable metallic luster and iridescence in the enamel.

TUBE SHOT AND SHELL.—Captain Scott has patented an improvement facilitating the manufacture of elongated steel shot and shell, by drawing steel tubes with projecting ribs to fit the rifle of the gun, to be cut up into proper lengths, and closed either by upsetting the ends with a hammer, or by welding or screwing on points and backs made and tempered separately.

CHARRED WOOD is inflammable in proportion to the lowness of the temperature at which it has been reduced. For gunpowder, the charcoal is made very slowly, at a low temperature, and consequently has a very low igniting point, requiring great care to prevent its igniting spontaneously. It is said that by taking years for the process, at a proportionally low heat, the dried and shrunken fiber, penetrated everywhere by air, will ignite at a temperature not far above that of boiling water. A charcoal sufficiently inflammable to be readily ignited by burning paper or shavings, would be a great domestic convenience for lighting anthracite coals, instead of kindling wood. Ordinary charcoal is retailed probably as low as kindling wood, for equal amounts of heating power; and the cost of slow charring, with cheap fuel and chemical aid, on a large scale, could hardly be more, while there would be a saving in freight, and a great advantage in the prompt efficiency of the article.

SWEDISH IRON.—There are 500 iron mines in Sweden, which yielded in 1864 half a million tuns of ore. All the ore is smelted with wood charcoal, and all refining processes are carried on with the same fuel, and with remarkable care and attention. With but the smallest traces of sulphur, and scarce a trace of the worst of all impurities, phosphorus, it is not strange that such ores, such fuel, and such pains, should produce a famous iron. Very little bar iron is manufactured, however, the annual product never having exceeded 200 tuns to 300,000 tuns of pig. About 5,000 tuns of plates are made for ship building. The Bessemer process has been introduced about five years, and produced in 1864 some 3,200 tuns. The amount of cast steel produced at the same time was 4,500 tuns.

SOUTHERN CORRESPONDENTS aver that improved culture of the soil encounters, as might be expected, obstinate prejudice on the part of the negroes. Deep plowing "kills the land." Concentrated chemical fertilizers, applied by mere handfuls, are "no account," and nothing but close personal attention from the manager can secure their being really employed. A few years of experience and observation will be required to implant the rudiments of scientific agriculture in their untaught minds. Among the white farmers, however, considering the impoverished condition of the country, the amount of improved implements and manures demanded is remarkable.

NAPOLEON'S CANNON is under trial at Vincennes in profound secresy, trusted officers alone being allowed to handle it, without the aid of soldiers. It is a copper piece of small caliber, said to make 12 to 15 discharges per minute, on the principle of the needle gun. Another report—hardly worth repeating—says it is discharged 40 or 50 times a minute, carries with accuracy 2,000 yards, and would destroy the whole front of a battalion at a single fire. The only hint—if it be so much—given of its construction, says that it is operated by "a series of metallic disks and a tourniquet."

ANOTHER PAPER MATERIAL.—Successful experiments are said to have been made latterly in France on the Lucerne root, which was tried for paper, as well as twine and ropes, some ten years ago. The fiber is strong, and it is said to yield 56 per cent of pulp, or a larger proportion than straw. It is treated in the same way. The paper now produced is described as very soft, white and beautiful.

THE popular opinion is that editorial assistance is dirt cheap—but we never knew a lower bid than one made to us the other day of "one glass of soda water" for a notice of the re-opening of a saloon. We respectfully decline. The ticket with the name and "compliments" of the proprietor printed thereon, is for sale. Price 5 cents.

MISCELLANEOUS.—In working an old slate quarry closed a hundred years ago, on the estate of Ballachulish, says the Oban *Times*, the workmen came the other day upon an old bore closed with a wooden plug, and containing gunpowder in a position which it was thought had not been disturbed for 150 years. On drying, the powder was found as explosive as ever.——Stone is now sawed in France with great rapidity and economy by means of a perforated disk of iron, on which a coating of lead has been cast, the perforations serving to connect and bind the plates of lead thus formed on the two sides of the disk. The lead is kept well covered with emery, which falls on it from a reservoir above.——Mount Baker, Or. is in active eruption from its southern peak, near the summit. The Indians say that this mountain about thirty years ago, as nearly as they can compute, was a volcano.——No sooner had the news been received of the ratification of the Russian treaty, than arrangements were made to put on a line of steamships between San Francisco, New Archangel, and Sitka, stopping at Victoria. The California, Oregon and Mexico Steamship Company's steamer *Oriflamme* is advertised to sail for the above ports on the 1st of June and will probably have a full cargo and list of passengers.——Hardwood timber, it is said, should be cut in late autumn and early winter, when least sap is in the veins, in order to retain its toughness, solidity and durability.——The undertakers of a certain district in France are on a strike. Their customers would like to join in a counter strike.——By the London Lloyds report for 1866, it appears that accidents happened to 11,711 vessels, more than half in January, February, March and December. Of these, 98 vessels are still missing, 341 abandoned, 1958 collisions, (492 without material injury) 530 foundered, 3381 stranded (of which 1,672 were got off) 171 fires, 2,234 involved total loss of the ship, 1946 total loss of cargo, lives lost 2644.——There are 3,241 newspapers published in Europe in the German language.

© 1867 SCIENTIFIC AMERICAN, INC

Combined Table, Cupboard and Clothes Rack.

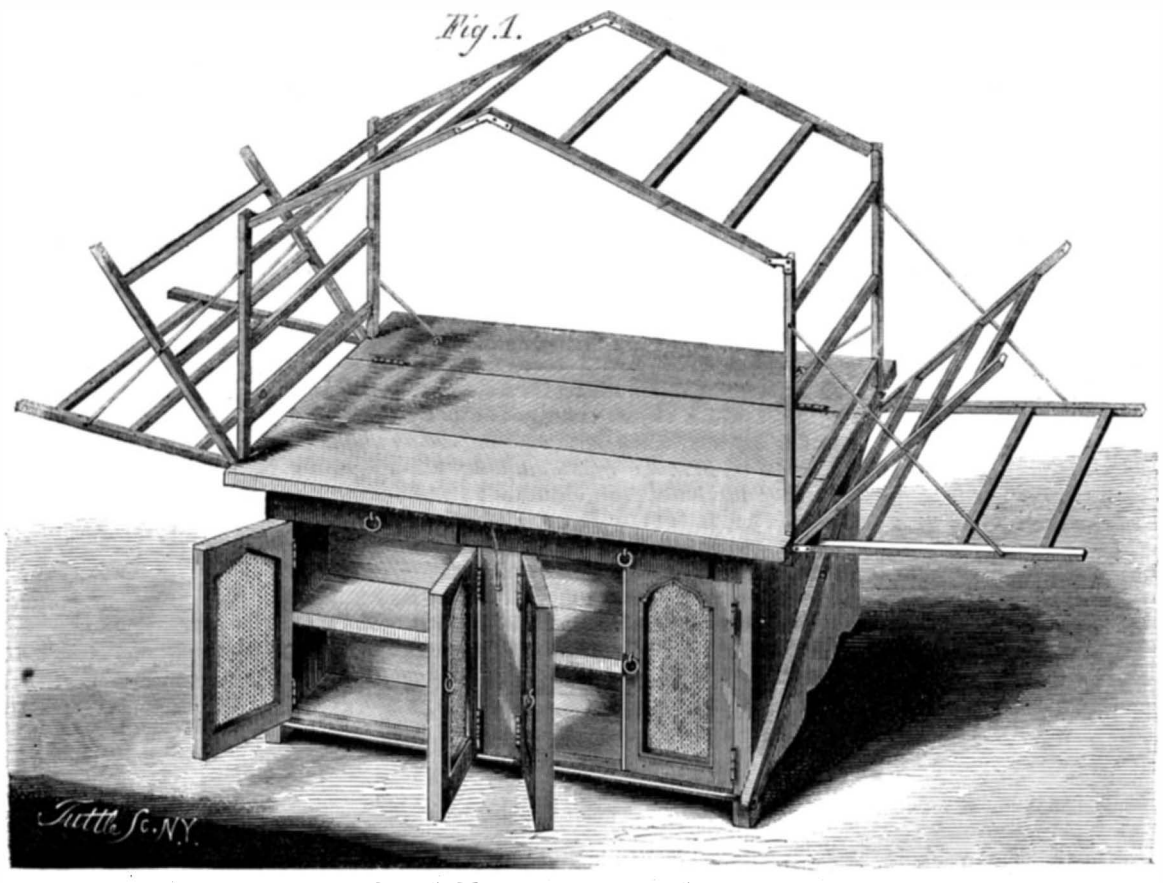
Inventive genius in this country has been for some years largely directed to contriving new appliances to lighten household labors and to increase the conveniences for the housewife's use. The piece of furniture represented in the accompanying engravings is a remarkable combination of table, cupboard, chest of drawers, clothes rack, etc., and is quite an ingenious contrivance.

In Fig. 1 we have the table top closed and the towel rack extended and united over it. Three of the sections of the rack, at each end, are hinged together at the edge of the table, and held in position at the proper angles by tapes fastened to the side bars. A hook on each inside bar engages with a small staple on the table top to steady the rack, and the two upper leaves are hinged to this upright one and united over the center of the table by a metallic clasp. When not in use the racks are folded together and dropped at the ends of the table, being held by a swing catch, as seen in Fig. 2. In the front of the table are wire gauze doors which close shelves forming a double cupboard for the reception of food, etc., to be preserved from the ravages of flies and other insects. Above these doors are drawers, one intended for the reception of spices and condiments and the other is a kneading board.

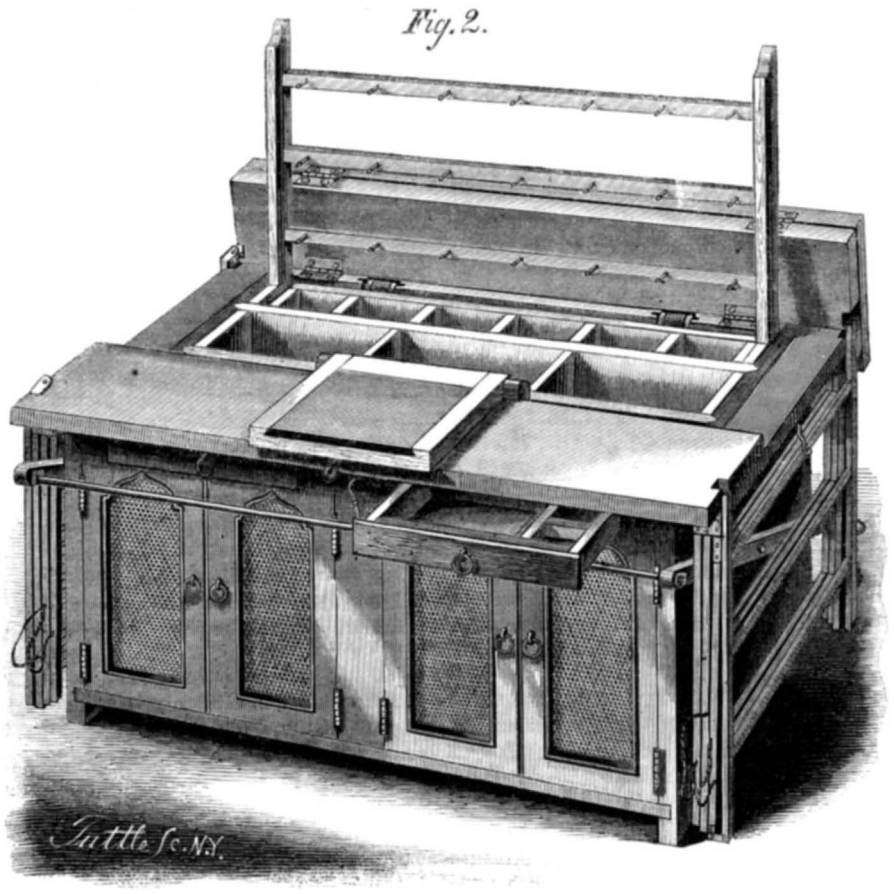
The center and back board of the table top are hinged, the center one to the back one and that to the table frame. When the first is opened three compartments or tills are seen, for containing bread, flour, and similar articles. In front of these recep tacles is a molding board set with a slab of slate or marble, and pivoted to a sliding frame in the body of the table by which it can be lowered or raised. In Fig. 2 it is seen as ready for use.

There is still another contrivance in this *multum in parvo*. It is a rack for holding tin ware and other utensils, having at the bottom a series of boxes for knives, forks, spoons, etc. This rack is reached when the back board of the table is turned over. When the table is closed the rack and its row of boxes are lowered into the table body, by means of straps fastened at one end to the bottom of the rack and passing over rollers in the back edge of the table frame. The other ends of the straps are secured to a horizontal bar on the outside of the table, which is connected at its ends to two levers pivoted on the center of the ends of the table. In front, also, the levers are connected in a similar manner. In Fig. 1 the front bar is down and the rack is inclosed in the table. In Fig. 2 the front bar is raised and the rack elevated.

This device was patented through the Scientific American Patent Agency, Feb. 19, 1867, by W. M. Baker, whom address at Fortville, Hancock Co., Ind., for further particulars.



BAKER'S COMBINATION KITCHEN TABLE.



Re-inventions.

A paper was read at a late meeting of the Institution of Naval Architects, by Mr. McGregor, showing how inventions relating to marine propulsion have been many times re-invented and patented. The examination, undertaken for official purposes, extends over a period of two hundred and fifty years, embraces over one thousand patents of this class granted during this time, but had reference chiefly to some eight hundred granted ten years ago. First, as regards the power employed for propulsion: he found that aside from steam, ten distinct patents were granted for obtaining the power from animals, thirteen from wind exclusive of sails, six from springs, three from gunpowder, twelve from compressed air, thirteen from gas, and six from electricity. Of the Water Witch style of propulsion, by ejecting water from the vessel, fifty-nine patents had been taken out. Plans for propulsion by discharging in a similar way, gas, fire, or steam, were protected by twenty-nine patents. The paddle wheel itself, under nine patents is to be turned by wind, under nine patents by animals, thirteen by men, and one by combined action of steam and manual power combined. Feathering floats have been patented scores of times, every case being almost identically the same in principle and construction.

The screw propeller has a like series of duplicates of inventions where patents for an increasing pitch number five, adjustable pitch fourteen, sixteen were granted for screws to steer with, thirteen for screws in tubes, six for screws and paddles combined, and twelve for the form now called "twin screws." Before the year 1858 one hundred and forty patents were taken out for propellers with fore-and-aft motion, and precisely the same plan has been repeatedly patented within the last nine years. The patentees most alert in taking out these eight hundred marine-propulsion patents were engineers and private gentlemen, while of that class most directly interested in improvements of this nature there were only fourteen naval commanders, eleven ship builders, eight ship owners, and five mariners.

Petroleum as a Painting Oil.

In No. 20, current Vol., page 311, we published the substance of a communication from West Virginia on "Lubricating Petroleum as a Siccative Oil," referring to experiments made. Prof. Dussauce, who conducted the experiments, desires to correct what would be otherwise an error, the statement in regard to West Virginia lubricating petroleum. He says the experiments were not made with the lubricating petroleums indiscriminately of that section, but with one entirely dissimilar to the ordinary lubricating petroleum, which is of the same specific gravity as sperm oil and contains no paraffine, nor does it congeal at a very low temperature, properties which belong, so far as ascertained, only to that kind. The Professor does not claim the same siccative qualities for all lubricating petroleums, but only for this, the name of which and territory where obtained he does not, however, give.

A MAGNESIUM HAND LAMP for mines and tunnels has been made on Larkin's plan, to burn the metal in the form of powder instead of wire or ribbon, being fed by a simple mechanism with a spring. Sand may be intermingled to moderate the consumption and the intensity of the light, and it is supposed that lime may be substituted for sand with brilliant and yet economical effect. The light can be raised or lowered in a moment, so that no waste need be incurred.

Steamship Economy.

Mr. Murray's paper, read at the late meeting of the Institution of Naval Architects, will carry with it some discouragement to those who had counted upon the attainment of great economy by the use on board steamships of surface-condensers, compound engines, super-heaters. etc. As for surface condensation, it is as true that it has failed in many cases by causing the destruction of the boilers, as that it has been quite successful in many others. The causes of failure are very justly traced, however, in most cases, to neglect on the part of the engineers, and thus they are wholly preventable.

As for compound engines, they have, as a rule, worked with less fuel for their power than single engines, and they have an advantage, in the case of very high expansion, of bringing less irregularity of strain upon the piston rods, connecting rods, shaft, and brasses. Thus far, however, in the case of screw engines, they have often given more trouble in working than single engines, breaking down more frequently. Their greater complication, and the greater total weight of the working parts, were of course, obvious at first, but we consider that it was the duty of marine engineers to fairly work out a system offering certain undeniable and very considerable advantages. This they have done, so far as low-pressure compound engines are concerned; but the real applicability of this class of engines, is with pressures much higher than are regularly carried in any steam vessels, this side at least of the Mississppi river, where, in fresh water, from 150 lbs. to 180 lbs. is considered a fair range. The case, of course, goes more against quick-working compound engines, for screw ships, than against the compound paddle engines, working at a very moderate speed on the Pacific, so far away, too, that there is no one to tell us their mishaps and infirmities, supposing any to exist.

As for super-heating, really good boilers with high steam domes around the uptakes are well nigh independent of such aid, and all boilers may be, and ought to be make to give dry steam. It is dry, rather than very hot steam, that is required. Unsaturated steam, as Mr. Fairbairn and Mr. Tate showed very conclusively by their experiments made seven or eight years ago, has its elasticity considerably increased by the addition of a very few degrees of super-heat; and this clearly shows that the superheat converts a certain quantity of suspended moisture into additional steam. But when the whole is in the condition of a dry and perfectly elastic gas, as is then the case, it requires, as is well known of all the gases, a very considerable quantity of heat to produce any important increase of elasticity. The specific heat of steam is low as compared with that of water, for instance—or, in other words, it takes much less fuel, or much less by any measure representing the quantity of heat, as distinguished from its mere intensity by the thermometer, to heat a pound of steam say 100 deg. than would be required to heat a pound of water as a liquid to the same extent. And from this fact the elasticity of say one pound in weight of steam could be doubled by the application of much less heat than would be required to produce as much more steam from water. In these facts lie the theoretical advantage of superheating, and if rubbing surfaces of cast iron or any other known substance would stand it, we might go on superheating to almost any extent, and with decided economy in fuel. But the limit if practicability is very soon reached, and it lies not very far beyond the ordinary temperature of high-pressure steam itself. The heat which melts tin, not to say lead, turns oil into gum, and converts packing rings and valves into scraping instruments of great rasping efficiency. And the superheaters burn out and fall to pieces in rust, and nothing can save them. For moderate superheating, however, and a high steam dome around the uptake appears to answers the purpose, there is a decided gain, as otherwise a considerable portion of water, already heated to the full temperature of the steam, is thereby prevented from running away with so much heat at every stroke.—*Engineering.*

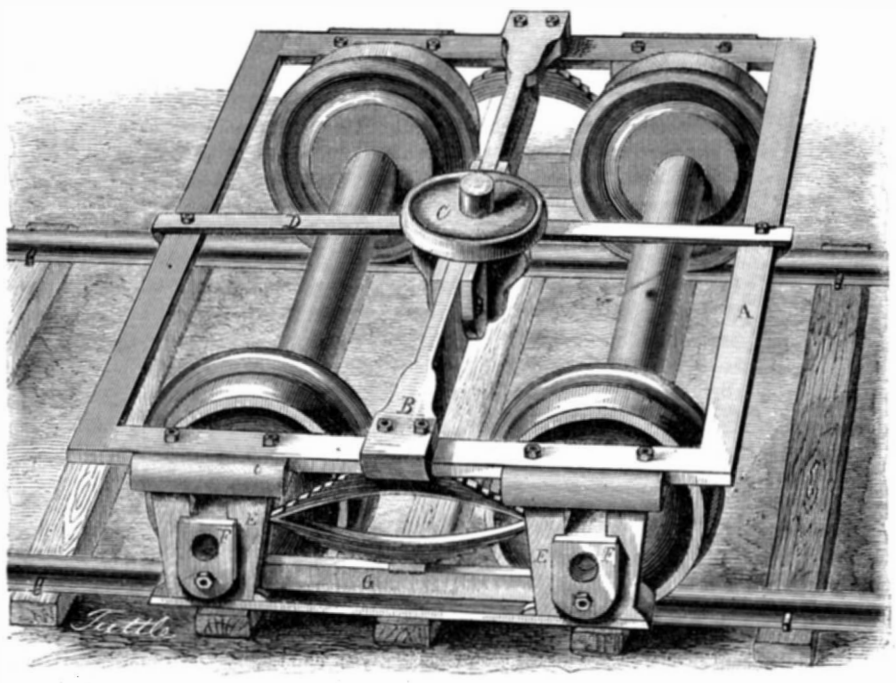
WORKING SHIPS' YARDS.—The improved method of bracing around ships' yards, introduced in England within a year or two, meets with high favor among those who have used it. The chain brace is continuous from one end of the yard to the other, passing across the deck through pulley blocks at the sides, and worked by a winch amidships. In bracing the yards one man can thus do the work of at least five, and the exposure and danger to the men is much lessened.

© 1867 SCIENTIFIC AMERICAN, INC

Improvement in Car Trucks.

The engraving is a perspective view of a very simple and strong truck for locomotives, freight, and passenger cars. The frame, A, is of iron, the sides braced by a bar, B, running across between the two axles. This bar is very deep and supports at its center the saddle, plate, and king bolt, C, having on its upper surface a recess to receive the plate. The saddle closes against the sides of the bar and is secured by screws or bolts. It is readily detached and another one substituted. D is a brace secured to the saddle and to the end bars of the frame, A. The struts, E, are bolted to the frame in the usual way. They carry the boxes, F, through the lower portion of which pass bolts or pins, which sustain the lower bar, G, on which rest the springs, either elliptical or semi-elliptical, in the lat ter case receptacles for their ends being formed on the bar, G.

The saddle support for the king bolt may be of steel or of cast or wrought iron. In the outer side of each box is an aperture through which the lubricating material can be introduced. These apertures are closed by slides, not seen in the engraving, to exclude dust. The arrangement of the springs with the bar, G, distributes the load evenly. The weight comes first on the spring through the medium of the bar, B, and is transmitted to the bar, G, and thence through the boxes to the axles. For passenger cars the double spring is used while the single spring is best adapted to locomotives and tenders. The whole truck is of iron, no wood being used. It is light, and from its material and method of construction, is strong. Railroad men will easily discover what advantages it possesses over the ordinary truck. It was patented January 22, 1867, by Reynolds & Cutler, whom address for additional particulars at Scranton, Pa.



REYNOLDS & CUTLER'S CAR TRUCK.

PETROLEUM AS A FUEL.

Fuel in the shape of coal is composed principally of carbon. Now in a case of perfect combustion, carbon combines with oxygen in the proportion of 6 lbs. of carbon to 16 lbs. of oxygen, and has a calorific value of 15. Allowing that coal is only 80 per cent. carbon, it will have a value of 12, and making a still greater allowance of 25 per cent. for imperfect combustion it will have a value of 9, which we will take as the calorific value of coal.

Fuel in the shape of petroleum is composed of carbon and hydrogen, (C_n+H_{n+2}) and the proportion by weight in the heavier oils is hydrogen one, to carbon six.

The calorific value of hydrogen is 64; therefore in a compound of carbon and hydrogen, which is one seventh hydrogen, the calorific value of the compound will be $\frac{15\times6+64}{7}=22$.

We have, therefore, for the calorific value of coal, 9, for the calorific value of petroleum oil, 22.

This allows for imperfect combustion of the coal, and perfect combustion of the oil. In practice, one pound of oil may be made to generate as much heat in combustion, as two pounds of coal.

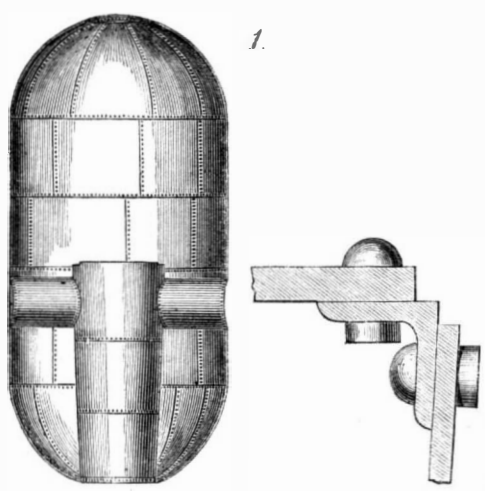
Probably no apparatus has as yet obtained these results, and no apparatus can possibly obtain more than this.

The above values are pounds of water evaporated (from 212°) per pound of combustible, and are taken from good authorities.

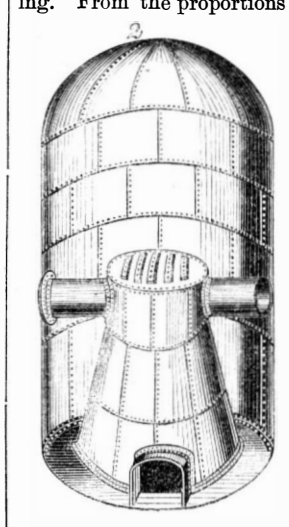
STEAM BOILERS---THEIR FORM, CONSTRUCTION, AND MATERIAL.

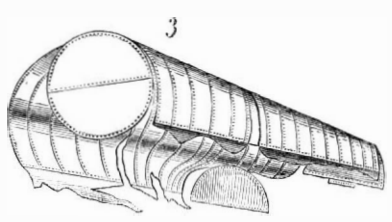
NUMBER FIVE.

In the last article we noticed several instances of explosions caused by imperfect and weak construction, while the form of the boiler was not at fault. It may be truly affirmed that such instances are altogether too common. A boiler is not merely a vessel of any prescribed form, made of boiler iron and riveted together. The stays, their strength, number, and arrangement are not less important, and where other devices are employed for strengthening the shell or other portions, the material should bear the proper relation in size, form, and fastening to the work it is expected to do and the force it has to resist. Want of judgment in these matters, and want of good workmanship will ruin the best planned boiler ever built.



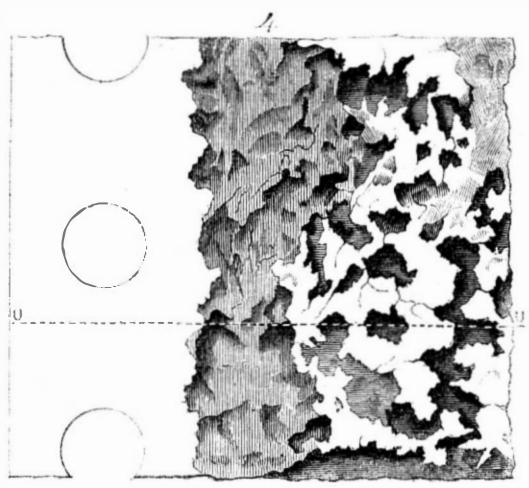
No. 1 is a case in point. This was an upright boiler with hemispherical ends, having a central flue rising from the bottom, connected near its top with a cross tube opening through the shell just below the center. This boiler utilized the waste heat from puddling furnaces, the heat passing over a portion of the shell, and then through the side tubes down through the center tube to the underground flue of the chimney. The ground plate forming the center tube was attached to the sides by a ring of angle iron shown in section in the engraving. From the proportions it can be seen that the angle iron is too weak. The pressure of steam on the flat crown plate fairly sheared the angle iron through, and the plate itself was blown down the tube into the chimney flue, when the boiler was violently lifted by the reaction of the water.

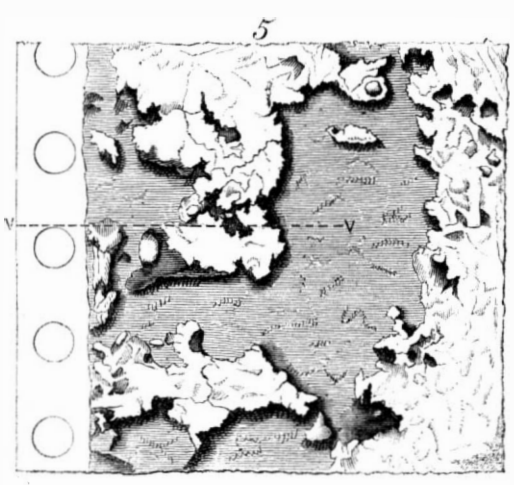


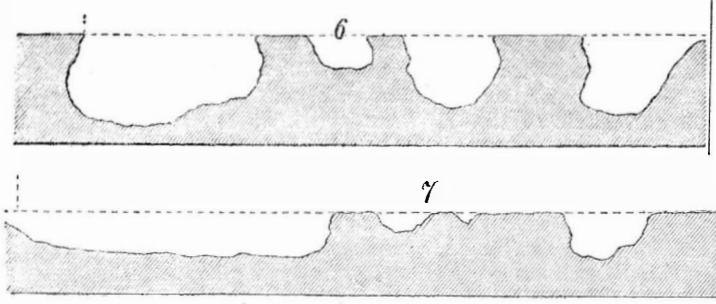


No. 2 exhibits a very weak boiler of a different construction. It has a flat bottom and an internal conical fire box with two side tubes opening through the shell. There were no stays between the fire box and the shell, and the fire box broke from its crown sheet and blew down upon the grate. The flat bottom gave way at the angle iron, while the shell flew to a great hight a shapeless mass.

Corrosion is a prolific cause of explosions. It may be local or general, internal or external. The latter sort of corrosion are too little noticed generally. Improper setting of boilers is one cause of it, and where the locality is concealed the deterioration may be carried on for a long period before attention is directed to it, and perhaps the first intimation may be a terrific explosion. Such an instance is shown in No. 3, where the corrosion followed the line of brick work upon which the boiler rested. The bricks being porous conducted moisture from a damp foundation and deposited it on the boiler at the point of contact, oxidizing the iron. Where the corrosion, either internal or external, is local and confined to a small surface, sometimes the strength of the surrounding plates will prevent an explosion, the boiler merely opening at the weak spot and discharging the water and steam, but this does not often occur. Corrosions generally extend over considerable extent; especially is this the case where the corrosion is internal, caused by impure water. Specimens of corrosion from this cause are given in Nos. 4, 5, 6, and 7. It attacks the iron in pits and spots, making deep holes in places where probably the iron is of a quality peculiarly susceptible to oxidation. Scale is undoubtedly a protection to the iron from this action as may be seen in No. 6, where the holes eaten by corrosion are larger below the surface than where protected by the scale.







This engraving is a section of the plate shown in face view in No. 4. It is drawn to full size and taken through the line, U. This plate was cut from the lower part of the shell of a large tubular boiler externally fired. The corrosion was greatest on that portion most exposed to heat and had been going on for eight years. It was caused by water obtained from iron mines. It will be seen that its effects extended almost through the plate.

Nos. 5 and 7 represent a portion of a plate taken from a plain cylindrical boiler which had worked about ten years. The section, No. 7, is on the line, V, No. 5. While scale undoubtedly protects, in a measure, the surface from corrosion, at the same time it conceals the progress of the mischief.

Before this series of articles is finished we shall further allude to this subject of corrosion.

English and American Guns.

The dynamic value of a pound of powder burnt in one of the great American guns, it is well known, is greater than in the best English guns—a circumstance generally imputed to the large capacity of the bore relatively with the powder burnt, which permits the larger expansive employment of the gases. The initial pressure of the powder gas is less in the American gun than in the English, from the less load per square inch of areaof bore which theball imposes. Thebursting or damaging action is therefore less, while the dynamic value is greater—precisely the effects which we wish to produce, as our object is not to burst the gun, but to propel the shot.

It has already been explained in these pages how we may, by the aid of piston shot and other devices, best expend the energy of a projectile in producing penetration of armor or other intended effects. Heretofore the difficulty has been how to impart the requisite amount of energy to the shot, and two systems for doing this have been propounded—the English high-pressure system, with which it is almost impossible to avoid the bursting of the gun, even when of wrought iron, and the American low pressure system, in which the want of pressure is compensated by increased area of bore, and by which cast-iron guns may be used with comparative safety. Of course, there is nothing to prevent the American principle from being produced in wrought iron as well as in cast; and no one would contend that the wrought iron would not be better. But whereas we have adopted a system which has already brought us up to the limit of our best materials, the Americans have adopted a system which, while realizing greater dynamic power, has not yet brought them to the limit of their worst. It is almost an insult to our intelligence to ask us which system is to be preferred.—*Engineering.*

It is stated that Mr. Roebling, of Trenton, N. J., the bridge builder, and the parties interested in the Brooklyn bridge, which is to terminate at Sands street, Brooklyn, and near Tammany Hall, New York, have decided that no piers in the stream will be necessary, one being placed upon each bank of the river, and the 1800 feet distance between being accomplished by suspension.

GREENLAND.—Mr. Edward Whymper, the Matterhorn climber, and Mr. John Browne, the Rocky Mountain botanist, have started from Copenhagen on a tour through the interior of Greenland, in the interest of science, and at private expense.

© 1867 SCIENTIFIC AMERICAN, INC

Correspondence.

The Editors are not responsible for the opinions expressed by their correspondents.

Hints to Inventors on the Destruction of the Potato Bug.

MESSRS. EDITORS:—Last year the potato tops were eaten up by great numbers of bugs, and the crop was very small. Some people would shake the stems a little, and the bugs would fall off, but next morning they had climbed up again. I know a man whose family picked more than a quart a day, but he did not raise as many potatoes as his family needed. In digging up the gardens this spring the grubs are found from 6 to 9 inches deep, just the same as last year, making their way to the surface in time to eat the coming crop. They are not found on any other plants, and very few are going to plant potatoes about this neighborhood this season.

I remember some years ago that the turnip tops were eaten the same way in England by a fly or bug, that diminished the crop so much as to affect the price of mutton, the large turnips being the main food for sheep, and farmers sowed very small patches. I remember well the laughter and derision that took place when it became known that a certain farmer, who had been boarding a poor Jack-of-all-trades that had been making what they ironically termed a perpetual motion, had sowed nearly all his farm to turnips, for they believed he would not get 50 good ones from it. The farmer and inventor told them that they had a machine that would save the crop: but nothing short of seeing the crop, which was an excellent one, of large, smooth, and almost spherical turnips, could convince them, and the result was, the farmer who found the means and the inventor who constructed the machine made each a fortune by supplying the machines for destroying the bugs or flies. It was very simple and resembled a sulky plow, having two wheels to drive a fan which sucked up the insects and dashed them against a board which killed them.

Now perhaps some experimentalist who has the means will take a hint from this, and enable farmers to destroy these loathsome and disgusting insects, so that since the old disease or rot has nearly disappeared, we may have plenty of potatoes.

W. J.

Galena, Ill., May 6, 1867.

Kerosene and Caterpillars.

MESSRS. EDITORS:—A few years ago I was living in a house in Kentucky, before which stood two beautiful shade trees of ailanthus kind. I had raised them from mere saplings, and they now stood as high as the roof, and were beautiful in form. My next-door neighbor has a number of apple trees, into which the caterpillar worm, sometimes called the silk worm, sometimes the drop worm, had got to a large extent, and had eaten up almost every leaf. The next year I watched for them on my shade trees, and sure enough they came in large numbers, and enveloped both trees with their gauzy network to a great extent. I had studied my plans, and when they had got full possession and well established in their colony, I put my plans in execution as follows. I got a long, one and a-half inch auger, with which I bored a hole down into the heart of the tree, at an angle of about 45°. I filled this hole with coal oil, such as I was then burning in my lamp, and corked the hole up. I watched for the result. The next day I perceived no effect. The second day I noticed a number of the insects crawling about the fences and bushes, and in other unusual places; so thinking I had done some little that evening I took out the cork and again filled the hole —which was empty—corking up as before. The third day they were to be seen running everywhere except on the shade tree, which they most decidely avoided, except the younger ones in the web which I had to take out forcibly. nevertheless I filled the hole again once more, My experiment stopped the progress of their destruction for that season on that tree.

R. Y.

Cincinnati. Ohio.

[The writer is silent concerning the effect on the tree. We suspect that there are trees as well as bugs to which coal oil is hateful. Perhaps his ailanthus would have run away as fast as the caterpillars had Providence furnished it with legs. We have heard of sulphur being used in a similar manner with like success and we should presume with less injury to the tree.—EDS.

BUSINESS AND MANUFACTURING ITEMS.

WOOLEN.—The Lewiston Falls (Me.) Manufacturing Company have "shut down" on account of the general depression in the woolen-goods market.—The Woodvale Woolen Mill, at Johnstown, Pa., which partially stopped work on the 1st of April, is now running with full force, but pays its operatives reduced wages.—The Pittsfield Woolen Company are starting up their machinery after a long silence, and beginning to manufacture heavy beaver goods for fall trade. 100 hands are employed.—Boffins & Co. have recently built a large woolen mill at Rushville, Ind.—The Oregon City Woolen Mills have lately received from the Worcester Loom Works six new looms, two spinning jacks and several other pieces of machinery. This manufactory will now have in operation 25 looms, most of them of the latest patterns, 8 spinning jacks, 6 sets of carders, and other machinery to match, with a capacity for working 600,000 pounds of wool, running day and night.

COTTON.—A new cotton mill is nearly ready to be started in Wauregan (Plainfield) Conn. It is a duplicate of the large mill built some 18 years ago by the Wauregan Company, and is connected with it by a middle structure 157 feet long by 40 wide, for repair shops and the water wheels. Their main mills are 500 feet long by 50 wide, with 5 stories, and will run 50,000 spindles and 1,124 looms on print cloths and sheetings. Machinery for this new mill was ordered in England, and some of it has arrived. The pickers, however, are all built in this country, and are not excelled by any either of American or English manufacture.—The Arnolds, who now carry on four cotton mills and employ 350 hands at North Adams, turning out 5,000 pieces of print per week, are building at Williamstown a new mill which will contain 300 looms.—The new mill of the Willimantic Linen Company is now more than half filled with machinery, of the newest invention, and is in successful operation. This is one of the largest thread establishments in the United States, making all sizes and 32 different shades of color.—An improvement recently patented in machine-knit hosiery consists in knitting a tube with protuberances and contractions at proper intervals, which form the heels and toes; so that a machine turns out, instead of the ordinary straight cylindrical web, a continuous string of stockings.

IRON.—The Troy Bessemer Steel Works are capable of converting 60 tuns per day.—The Albany Iron Manufacturing Company, incorporated at the late session of the Legislature, has bought 50 acres of land in Albany, and will build thereon a blast furnace, rolling mill, etc. Other parties will erect a stove foundry, which will give employment to 125 hands, on the island south of the city.—The stock of a new company for the manufacture of knitting machines under an exclusive patent, has been taken at Bath, Me.—Three small iron steamboats have lately been built in San Francisco for the navigation of Lake Chapala, in the interior of Mexico, near the city of Guadalajara. The first boat has been shipped in pieces to San Blas. From that port the materials will be hauled over mountainous roads several hundreds of miles to the shores of the lake, where the boat will be put together and launched.

RAILROADS.—The Pittston *Gazette* says: The Lehigh Valley Railroad is being pushed on with commendable energy. We can see nothing to prevent this route to Wilkesbarre and the cities being opened at the time first announced, August next. —The Union Coal Company's road is rapidly approaching completion. During the month of May the third rail will be laid, and trains put on.—The British Railways in existence at the end of 1865 cost a total of £455,478,143, or nearly 2¼ billions of dollars.—India contained 2,747 miles of railroad which conveyed 12,826,518 passengers in the year 1864-5. The commercial progress of British India is shown by comparison of the imports of 1840-1, amounting to £8,415,940, with those of 1864-5, which amounted to £28,150,923, besides £21,363,352 of treasure.—There are about 86,000 miles of telegraph now in the world, carrying nearly 250,000 miles of wire.—The summit of the intended Mount Cenis Railroad is 5815 feet above the sea level. The terminus of the railway up Mount Washington will be 6,226 feet. A contemplated mountain railway from Vera Cruz to Mexico must ascend 8,400 feet, and this hight must be climbed from the ocean level in a distance of 150 miles; the gradient for great distances is as much as 1 in 25, and this with many and short curves. The highest elevation on the Pacific Railroad is 9,504 feet at the one hundredth meridian.

MISCELLANEOUS.—The estimated value of the manufactures of San Francisco for 1866 was over $20,000,000, and the aggregate in the State about $30,000,000. More than usual attention has been given recently to the manufacture of plows, farm wagons, and the smaller implements of husbandry.—Quarrying for the new bridge over the Ohio, at Louisville, cost, $1,500,000, has already begun. The stone work is to consist of two abutments, each 80 feet in hight, and thirteen piers each from 120 to 140 feet in hight. The bridge is to be ready by 1870.—The movement of grain is for the present quite reversed in its direction. European and Californian bread stuffs, it is said, find their way to New York and even to the Western States.—The Modena, N. Y., Hat Company have just begun to manufacture a new style of ladies' and gentlemens' hats under a patent recently granted. It is a close imitation of straw, water-proof, and not injured by crushing. They turn out one hundred dozen a day.—A new hydraulic pipe and file machine in operation in Charlestown, Mass., runs at an expense of 60 cents per day, turns out 1,000 feet of pipe, from 3 to 12 inches in diameter, per day, with about 13 tuns pressure on every pipe.—From the reports of customs at Sydney, Australia, it appears that the imports of sawed timber from Oregon are nearly 3,000,000 feet annually. —The mammoth Lindell hotel, at St. Louis, is to be rebuilt. The subscriptions already amount to $285,000.—The street department of the city of Montreal has tried with satisfaction the plan of loosening up packed snow and ice by means of a plow instead of the pick. Some inventor can doubtless furnish a still more effective implement for this purpose.—Caird & Co., of Glasgow, have contracted to build a new 2,600-tun screw steamer for the North German Lloyd's, to ply between Bremen and New York.—The *Great Eastern*, whose first round trip between America and the Paris Exposition must have paid considerably less than current expenses, has discontinued her luckless movements and is lying at Liverpool, the French Company undoubtedly having thrown up their contract, with a heavy loss already on their hands and a probability of damages and costs yet to pay at law. Passengers who had paid for the next trip are getting their money back.—The great steam ram *Dunderberg* was purchased at short notice by the French Government through the Atlantic telegraph, while the peril of war was still imminent. The cost of the ship, about $1,750,000, is said to have been paid.

POMPEII.—One of the latest discoveries reported from the excavations, is that of a bronze vase hermetically sealed, and containing a considerable quantity of water, which was pronounced clear, fresh, and remarkably soft, after its repose of 1800 years.

MINING INTELLIGENCE.

THE NEW COLORADO COAL FIELDS.—At Belmont, Boulder county, eleven distinct veins of coal have been discovered. The principal vein yet worked is nearly horizontal, commenced with a thickness of two feet, has deepened to twelve, and is deepening still. The other veins vary from three to twenty-one feet in thickness. All are packed in fire clay above and beneath. At Profile Butte, three miles south of Belmont, seven veins have been found under precisely similar conditions, partially laid bare in the bank of a creek. Elsewhere also, the coal appears all along the mountains. Specimens from a vein 11 feet thick, containing considerable rosin, have been received at the General Land Office, Washington. Mr. Herman Stoelting, the mining engineer who reports these facts, describes the coal as of a fine black color, burning with a long yellow flame, emitting but little smoke, and leaving but little ashes, of a white or reddish color. It appears to be uncommonly free from slate and iron pyrites. Judging from the surrounding deposits, the coal is not a true bituminous but a brown coal or lignite. Iron ore is extensively scattered over the surface, in quantities sufficient to supply several blast furnaces for a series of years. Pieces as large as 1000 pounds in weight have been found imbedded in the soil. It yields from fifty to seventy per cent of metallic iron. The ore also contains manganese, which renders it favorable for smelting.

THE CANADA GOLD MINES.—An official report from the Inspector of the Quinte gold-mining district shows that up to the 6th of May about one hundred shafts had been sunk in Madoc and surrounding townships, and within the last month some two or three thousand miners, prospecters, etc., have added themselves to the population. A steam quartz-crushing machine had been imported and would go into operation in a few days. Daily mails are extended through the mining region, and a line of telegraph is being rapidly pushed forward to a central point. The Montreal *Herald* notices a Chaudiere nugget weighing fifty-one ounces, and worth nearly $1,000 found upon what is called the Kilgour claim, at about eighteen feet below the surface of the ground, and some thirty feet distant from the Gilbert river. Mr. Lombard, of Chicago, is now the owner of the Richardson mine. Quartz machinery will be placed on the spot and a large amount of capital invested.

The gold discoveries in the Vermillion Lake region, Minnesota, are being extensively worked.

The Levant mine, Cornwall, commenced in 1820, has turned out $5,000,000 worth of copper and tin ores. The engine shaft is now 1700 feet below the surface, and two of the levels extend about three quarters of a mile beneath the Atlantic Ocean.

Several veins of the valuable "black band" ore (a mixture of nearly pure iron and coal which we have heretofore described) are being worked and new veins are being opened. The total amount shipped over the Mill Creek railroad, to April 20th, was 2,866 tuns. A bed supposed to be black band. or carbonaceous iron ore, has been found at Phœnix Park, lying immediately on the Diamond or J. It is about ten inches thick, and can be worked with economy in connection with the coal, by the Welsh plan of mining.

Peat of an excellent quality is found in Wisconsin, and can be supplied to consumers at one fifth the cost of any other fuel.

It is stated that in the exportation of coal Erie ranks second in the United States. The amount of the export trade of 1866 was over 250,000 tuns. The bituminous coal is taken by vessels to the ports on the upper lake—mostly to Chicago. The returning freights are made up from the ores of Lake Superior.

OIL.—During the four days ending April 12th, the receipts of petroleum at the port of Pittsburgh reached the unprecedented amount of 97,284 barrels, the greatest amount ever received in the same duration of time since the establishment of the oil business. The Titusville *Herald* says: The amount of iron tankage is now over one half million of dollars. Large owners have determined to store all their oil until a fair price can be had, and with a half million barrels safely stored now, and another half million of tankage, to place the oil market absolutely under the control of oil producers and speculators.

Galand's New Breech-Loader.

This simple invention, which has gained immediate attention in Paris, is the production of a gunsmith at Liege. A screw closes the breech, which is partly hollow, and contains four pieces constituting the whole mechanism, viz: the percussion needle, a spiral spring, a pin performing the office of a trigger, and a sort of hook which operates to cock the gun. Two turns of the screw open or close the breech, and the whole is taken to pieces by unscrewing a single nut. The gun can be made for 25 francs, or less than $5. A device analogous to that in the James cannon is used to prevent the loss of gases at the breech. A sort of conical copper thimble is attached to the extremity of the breech screw, made of extremely thin metal, so as to spread out by the pressure of the gases at the instant of discharge, and cover the joints into which they would otherwise penetrate. The powder is fired from the upper part of the cartridge, by pressing the pin above named. The cartridge consists of a small canvas bag with a disk of pasteboard at the bottom, and at the center of the disk a little fulminate; upon this five grammes (say 1-5 oz.,) of powder is placed; next, a greased wad; finally the bullet, over which the bag is tightly tied. Nothing remains of the cartridge in the barrel after firing

COAL IN AFRICA.—Dr. Livingstone's last expedition inland, from Pemba or Kinday harbour, disclosed frequent trunks of silicified wood, a sure indication of coal berneath, and pieces of it were met with in the sands of the river.

© 1867 SCIENTIFIC AMERICAN, INC

Recent American and Foreign Patents.

Under this heading we shall publish weekly notes of some of the more prominent home and foreign patents.

EXPRESS MONEY ENVELOPE.—E. Hulbert, Atlanta, Ga.—This invention consists in an improved express money envelope so constructed that the enclosed package may be protected on all sides by a double covering, and which, it will be impossible to open without leaving traces to show that it has been tampered with.

WIND POWER.—C. C. Gish, Virden, Ill.—This invention relates to a new and improved wind power designed for pumping water, and it consists of a wind wheel constructed in a novel manner and arranged in connection with a pump, tank, and a receiver provided with a valve with float attached, and connected with a lever by which the wings of the wind wheel may be opened and closed automatically.

PRESSING BRICK.—Horace Crofoot, Oak Park, Ill.—This invention relates to a new and useful improvement in pressing bricks from dry clay. The object of the invention is to compress the dry clay in such a manner that atmospheric air will be expelled therefrom, whereby the pressed clay or unburnt bricks are prevented from cracking while being burnt, a contingency which at present causes many imperfect bricks owing to the cracking of the same by the expansion of the air in them under the heat of the kiln.

BEDSTEAD.—G. G. Cochrane, Brooklyn, N. Y.—This invention relates to a new and improved means employed for securing the parts of the bedstead together, whereby a firm and secure connection of the parts is obtained, and which will admit of the bedstead being put up and taken down with the greatest facility.

FLOUR BOLT.—Benjamin Boorman, Waukesha, Wis.—This invention consists in constructing the reel in such a manner that it will have a smooth interior without any obstructions or projections to interfere with a proper passage of the drop through the bolt. This result is effected by securing the bolting cloth to the inner surfaces of the longitudinal slats of the reel frame.

MOP HEADS.—H. H. Mason and Joseph Messenger, Springfield, Vt.—This invention relates to a new and useful improvement in that class of mop heads which have their movable jaws operated by a screw and nut. The invention consists in a novel way of attaching or connecting the ends of the wire or rod, comparing said jaw to the nut, whereby a very cheap and durable connection of said parts is obtained.

ATTACHMENT FOR FAN MILLS AND OTHER MACHINES.—Herman Wolf, Avon, Pa.—This invention has for its object to furnish an improved device for attachment to fan mills and other machines to hold them steady and in their places while being used, and by means of which they may be adjusted and held steadily even upon an uneven floor.

BRICK MACHINE.—Thomas Walsh, John Walsh, David Evans, Brownsville, Tenn.—This invention relates to a new and improved machine for pressing and molding bricks, whereby a very compact, strong and durable machine for the purpose specified is obtained, and one which will perform the work expeditely with but a moderate application of power.

CULTIVATOR.—G. W. Stockton, Oquauka, Ill.—This invention relates to a new and improved cultivator for cultivating crops grown in hills or drills, and consists in a novel manner of hanging and arranging the plow beams, whereby the plows are placed under the complete control of the operator and rendered capable of being moved laterally or vertically as occasion may require.

COTTON PICKER.—J. E. Carver, Bridgewater, Mass.—This invention relates to a new and improved cotton picker designed to supersede the direct manual process or the detaching of the cotton from the bolls directly by hand. The invention consists in the employment or use of a reciprocating tongue provided with teeth and fitted within an oblong quadrilateral box. This tongue is armed with reflex spires or teeth and directly above it within the box, there is an elastic plate also armed with reflex spires or teeth which serve to hold the cotton abstracted from the bolls and drawn into the box by the inward movement of the tongue and insure its discharge from the rear end of the box.

RAILROAD SWEEPER.—Edward A. F. Olmstead, New York City.—This invention has for its object to improve the construction of the railroad sweeper patented July 10, 1866, and numbered 56,256, so as to make its operation more satisfactory and effective.

POTATO DIGGER.—Thomas Burditt and George B. Burditt, Dansville, N. Y.—This invention has for its object to furnish a simple and convenient hand machine for digging potatoes by the use of which the operation may be greatly facilitated.

APPARATUS FOR PACKING COTTON AND SIMILAR SUBSTANCES.—F. A. L. Cassidey, Newmansville, Fa.—This invention has for its objeet to furnish an improved apparatus for packing cotton and other similar substances and introducing them into bags or sacking.

APPARATUS FOR IMPREGNATING WOOD.—George Pustkuchen, Hoboken, N. J.—This invention relates to a machie nin which railroad ties and sleepers and any other kind of wood can be dried and saturated with tar or any other suitable substance which will prevent the decaying of the wood. The in vention consists in the arrangement and construction of a boiler and of a sheet-metal cylinder into which the wood is placed. The annular boiler surrounds the cylinder and is placed upon a furnace; the steam created in the boiler is used to drive an air pump whereby a vaccuum is created in the drying cylinder, and the pores of the wood are opened to receive the substance with which they are to be filled.

NIPPERS.—Thomas G. Hall, New York City.—This invention relates to a pair of nippers the movable jaw of which is secured to one end of a lever, the other end of which is acted upon by a toe attached to the inner end of the appropriate handle in snch a manner that a great leverage is effected and the operation of the nippers in cutting wire or other articles is materially facilitated. The stationary jaw is secured to the end of its handle by dovetail end screws so that the same can be readily taken off for the purpose of sharpening or that it can be replaced when worn out. A suitable set screw prevents the cutting edges of the two jaws from overlapping or from being forced too close.

DEVICE FOR SHARPENING CUTLERY.—James Meyer, Jr., New York City.—This invention relates to a new and improved device for sharpening cutlery of all kinds, and has for its object portability, efficiency and economy in construction. The invention is an improvement on that class of sharpeners in which the hard steel cutting plates are connected by a pivot and between which the blade to be sharpened is drawn. An engraving of this invention will shortly appear in our columns.

SMELTING FURNACE.—James A. Root, East Canaan, Conn., and J. N. Bartram, Sharon, Conn.—This invention consists in constructing the hearth of stone cut and laid in such a manner as to have a circular interior in its horrizontal section and admit of the furnace operating perfectly when first erected. The usual way is to build the hearths of fire brick, and of square form, which invariably operates imperfectly until ition caused by the descending ore wear them in cylindrical form. e angular corners form a great obstruction to the descending ore and occasion considerable trouble until they become rounded by wear. The invenonfurther consists in a novel and improved manner of constructing the blast tubes, to wit: with telescopic slides or extension pipes, as hereinafter fully shown and described, whereby said pipes may, with the greatest facility be graduated in length as circumstances require.

MACHINE FOR GRINDING AND GAGING SCALE PIVOTS.—Frederick Meyer, Newark, N. J.—The object of this invention is to grind or polish the pivots on scale beams and levers in such a manner that thereby the same are correctly gaged so that the distances between the different pivots are exactly and automatically determined.

DEVICE FOR REGULATING THE FLOW OF LIQUID.—J. H. Guild, Rupert, Vt.—This invention relates to a device whereby the flow of liquids into vessels of any description may be regulated so that the liquid may not rise above a certain mark. Its object is to so arrange the apparatus that the valves which generally get out of order after having been used for some time, may be done awa with

SLEIGH BRAKE.—Frederick Cohlmeear, Keck's Center, N. Y.—This invention has for its object to furnish an improved sleigh brake, so constructed and arranged that whenever it is necessary for the horses to hold back the sleigh, the act of holding back will apply the brake with a force proportioned to the forward pressure of the sleigh.

CHURN.—William Alexander, Union Valley, N. Y.—This invention has for its object to furnish an improved churn, simple in construction, not liable to get out of order, and which will churn the cream quicker and more evenly than the churns now in use.

SCRAPER.—Philander S. Foster, Richmond, Me.—This invention has for its object to furnish an improved scraper, by which the snow may be removed easily and quickly from ice, streets, walks, yards, etc.

CULTIVATOR.—A. T. Heflin, Monmouth, Ill.—This invention has for its object to furnish an improved cultivator, by means of which two rows may be cultivated at the same time.

STUMP EXTRACTOR.—David Carroll, Union, Pa.—This invention relates to that class of machines employed for extracting stumps in fields, and consists in the employment of an endless chain, in combination with three wheels, over and around which the chain works, the said wheels being located upon a derrick erected for the purpose.

BEEHIVE.—Lafayette Kramer, Point Pleasant, Pa.—This invention relates to improvements in the construction of beehives, and consists in the arrangement of movable boxes fitted in a case for double or single hives, and so connected that a swarm of bees can be driven from one box into another box, which is empty, whenever the cells in the old honey comb become clogged with wax, causing the bees to degenerate in size and activity, and it is necessary to restore the swarm by building a new comb; also in a convenient provision for colonizing or forming new swarms; also in plans for thorough ventilation of the hive, and for a moth trap which effectually excludes the bee moth from the hive, and provides for the destruction of the worms.

COTTON-BALE TIE.—William Onions, St. Louis, Mo.—This invention relates to an improved device for fastening the iron hoops on cotton and other bales.

PLOW.—Darwin Almy, Tiverton, Mass.—This invention consists in a guide or regulating wheel, and its connections for attaching to any common plow, and detached when desirable.

LOCK.—George B. F. Cooper, New Albany, Ind.—This invention relates to an improvement in locks more especially designed for railroad freight cars, but applicable to warehouses and other purposes, and capable of modification for use on either sliding or swinging doors.

SELF-ADJUSTING CAR TRUCK.—J. Q. A. De Huff, Summitville, Iowa.—This invention relates to an improvement in railroad car trucks, and consists in arranging each of the wheels to run on an independent axle, instead of connecting them to run in pairs on the same axle, as usual; but while the wheels shall move independently of each other on their own axles, they are so connected and arranged in movable boxes that they shall act in concert, and in turning curves of a track the axles will all preserve a position at right angles to the line of motion.

STEAM AND LIQUID PRESSURE REGULATOR.—William H. Stanton, Dunmore, Pa.—This invention consists in arranging a cylinder and piston and other appliances, and controlling the piston in such a manner that being connected with the safety valve lever, and operated by steam from the boiler, the safety valve will be opened or closed by the pressure of the steam on the piston.

DOOR HOLDER.—William Quagle, Warsaw, Ill.—This invention relates to the manner in which a swinging door is made to stand in any desired position when open.

STEAM GENERATOR.—Thomas C. Little, Dixon, Ill.—This invention consists in injecting water by a force pump against heated and steam generating surfaces.

KETTLE.—Allen N. Merrill, Batavia, Ill.—This invention consists in pivoting the cover to the rim or flange of the kettle at one side or eccentrically, and providing a lip at the opposite side of the top of the kettle, by which the lid is fastened or prevented from raising without raising the kettle; and also in the manner in which the cover is locked in that position.

OIL CUP.—William Douglas and H. M. Ingler, Bellair, Ohio.—This invention consists in so constructing an oil cup that the oil that reaches the wrist or journal shall be discharged upward, by the motion of the cup on the crank, through a hole so small that the quantity discharged shall only be sufficient to lubricate the wrist for which it is intended.

APPARATUS FOR THE PRODUCTION OF ILLUMINATING GAS FROM PETROLEUM.—Heinrich Hizel, Leipsic, Saxony.—This invention relates to improvements in apparatus for the production of illuminating gas from petroleum and petroleum residue, and consists of a mechanism for pumping petroleum or petroleum residue into a retort heated to a red heat in a continuous jet. Being there immediately converted into gas, it is conducted to a condenser, and thence led to the gasometer.

MANUFACTURE OF VINEGAR.—John Higbie, Ulster Park, N. Y.—This invention relates to an improved process for the manufacture of vinegar from apples, including the skins and cores, the refuse going to make, when mixed with steamed potatoes, ground feed, and refuse milk when convenient, an excellent feed for pigs.

LINIMENT.—James. C. Dustan, New Vernon, N. J.—This invention or discovery relates to an improved composition liniment, or medical compound, for the cure of sprains in the joints of horses and other animals, spavins, ring-bones, splints, poll evil, fistulous withers, stringhalt, and other diseases to which horses are especially subject,

BENCH VISE.—Charles R. Gibson, Madison, Ind.—This invention relates to a method by which the vise is made to adjust itself to the shape of the article put into it whether such article be square or tapering.

Answers to Correspondents.

CORRESPONDENTS who expect to receive answers to their letters must, in all cases, sign their names. We have a right to know those who seek information from us; besides, as sometimes happens, we may prefer to address the correspondent by mail.

SPECIAL NOTE.—This column is designed for the general interest and instruction of our readers, not for gratuitous replies to questions of a purely business or personal nature. We will publish such inquiries, however, when paid for as advertisemets at 50 cents a line, under the head of "Business and Personal."

H. S., of Ohio.—Take nitric acid, dilute it with water—equal proportions of each—moisten the gun barrel with it, and let it lie a day or two. Wash it in water, and rub with oil and polish with beeswax. The barrel must be free from grease when the acid is applied. This will handsomely brown your barrel.

I. W. A., of Ohio.—You will find our ideas of perpetual motion briefly expressed in No. 21 current volume page 330 and 331. . . . Miller's saw teeth are inserted by springing the plate of the saw half the thickness of the tooth. Address the patentee for more definite information.

V. C., of Mich.—The error of substituting "feet" for "inches" in our paragraph relative to the steamer *Russia*, is so evidently a typographical one that your inquiry is superfluous. "Even Homer sometimes nods" etc.

G. H. M., of N. Y.—Green wood in seasoning shrinks or contracts. Of course if a seasoned spoke is driven into a mortise made in a green hub, when the hub is seasoned the spoke will be loose.

W. W. T., of Mass.—Rifle balls are usually lubricated with a mixture of tallow and wax. Paraffine is now largely used and is the best and cheapest. If too hard, melt a little tallow with it.

J. P. J., of Conn.—You can make a brilliant green for maps, charts, and engravings to be tinted with water colors by pouring the whites of eggs on common coffee berries. It is glossy and durable.

S. M. P., of Mass.—A cut nail if crooked will break when straightened on stone sooner than when straightened on iron. It may be from the want of elasticity in the stone, but probably is on account of the irregularities of surface or the softness of material of the stone, allowing the ends of the nail to imbed itself and offer resistance to its movement

J. L., of Pa.—Mica has been used for a long time for the windows in stoves and furnace doors. Lately it is used for reflectors, and for ornaments, one side of it being silvered with pure silver. The value of mica depends upon its transparency and the size of the sheets. Pieces only a few inches square are saleable provided they are clear and free from blemishes.

J. R. B., of N. Y., proposes to increase the efficiency of powder in blasting by securing a body of air between the charge of powder and the tamping. A few inches above the powder, the fuse having been properly adjusted, he secures a wad of cloth or tow and then fills up the hole with sand or other tamping material, He has tried the experiment with very satisfactory results. He illustrates the philosophy of the case, by alluding to the well known fact that guns are liable to burst when the charge is not well rammed down to the powder.

F. E. B., of Iowa.—"What is the greatest weight lifted by water wheel 4 inches in diameter, under 2 feet head and 2 square inches of water?" The water strikes the wheel at a velocity of 681 feet per minute. This velocity of a stream 2 inches in cross section gives a total force of 295·8 foot lbs. exerted on the wheel. An undershot wheel returns about one-third of this force, and the best turbines about four-fifths; consequently from 100 to 240 pounds per minute, might be lifted according to the construction of the wheel.

S. F. G., of Conn.—We have a favorable opinion of seasoning wood by the use of steam. By that process you may prevent the cracking of the wood which you use for screws, mallets, etc.

C. N., of N. Y.—We are not aware that any one has on sale an ink which is so fugitive that it becomes invisible shortly after writing with it.

G. L., of R. I.—To construct a small water filter, provide a false bottom to your cask, perforated with holes all over its surface; spread over this bottom one or more thicknesses of flannel, upon this a layer of fine clean sand, upon the sand pulverized charcoal, and at last fill up with gravel. A good proportion of sand charcoal and gravel would be, sand 1, charcoal, 4, gravel 2.

N. F., of Vt.—Dextrine is an excellent adhesive and is sometimes used on envelopes.

J. M. C., of Ill.—Water may be raised by a hydraulic ram to operate an overshot wheel, and when well constructed will utilize about 60 per cent of the force of water *i. e.* 100 lbs. of water will lift 60 lbs. to the hight from which the 100 fell, and 30 lbs. to double the hight. A turbine is more economical than the ram when a large quantity of water is to be raised.

L. D. G., of Me.—Waste no time nor money on divining rods, or fortune tellers.

A. M., of N. Y.—The best cheap solvent of india-rubber is petroleum naphtha. Some of the other solvents are bisulphide of carbon, benzole, sulphuric ether, chloroform, and camphene.

H. V., of Conn.—The neutral chromate of potash is yellow, and the bichromate is red. The first is the article you need for the ink. If you ask for yellow chromate of potash the druggists will understand you.

H. M. T.—"How many revolutions on its own axis will a wheel make in rolling once around a fixed wheel of the same size?" One.

L. and C., of Ind.—You can purify your gold alloy by keep- it melted in contact with air, or by melting it with borax and adding saltpeter.

C. E. D., of Mich.—You will probably not make a good job of patching your looking glass. Make the experiment thus: take a piece of tin foil a little larger than the bare spot on the glass, amalgamate its surface, cover the spot with it and retain it in place by means of a pad of cloth. The pad may be removed in a week.

R. W. R., of Pa.—The working load for a hempen rope 2 3-4 inches in circumference is from 600 to 900 lbs. breaking strain two to three tuns. You need such a rope for your system of pulleys (5 fixed and 5 movable) when you wish to raise a weight of 7000 lbs. The strain on each of the ropes of the system would be 700 lbs.

T. P., of N. Y.—We suggest that you try paraffine as a protector of the iron work, in your bleach house, which is exposed to the fumes of sulphur. The paraffine may be applied in the melted state or in solution of petroleum oil.

H. H. H., of Miss.—You will find on reference to the former issues of this paper abundance of reliable formulas for the preparation of writing ink.

C. O. V., of Pa.—To discharge the magnetism from a small piece of steel like the balance of a watch determine in what parts its poles are located, and bring in contact with one of them, the similar pole of an ordinary magnet.

B. R., of N. Y., believes the cause of abortion in cows is an unnatural position of the foetus, by which the unbillical cord becomes pressed against its throat and stops the circulation of the blood. The peculiar position of the foetus is often brought about, when the cow jumps over fences or wide ditches.

E. C., of Vt.—Dry gas meters are now extensively in use, and they are constructed on the bellows principle which you describe.

R. C., of C. W.—Straw goods are bleached by exposing them to the fumes of burning sulphur. A good way to carry on the process on a small scale, is to place a few ounces of sulphur on an earthen plate at the bottom of a barrel, set the sulphur on fire, and hang the articles to be bleached, above reach of the flame. The barrel may now be covered till the bleaching is perfected. You will have no difficulty in bleaching straw like the sample you send. . . . You can prepare hypochlorite of magnesia, by adding a solution of Epsom salt to a solution of bleaching powder, until the precipitate of sulphate of lime ceases to be produced.

W. B., of Mass.—You may make a silicate of soda which will answer your purpose as follows: Take pulverized quartz 1 part, bicarbonate of soda 4 parts, mix intimately and melt in a crucible. When the glass is cold, pulverize and dissolve by boiling in water.

A. H. B., of Vt.—Add about five per cent of tin to the zinc which you cast in thin plates. The alloy melts at a lower temperature and is more fluid than zinc. In casting see that the sand is not too damp, and have wide gate ways.

G. B., of Mass, says: "In your 'Answers to Correspondents,' No. 18, current volume, you reply to 'A. D. B.,' of Mass., that his engine of 13½ inches, 30 inches stroke, 72 revolutions, and 80 pounds pressure, steam cut off at half stroke has a horse-power of 99·078. I make it about 40 horse-power. Will you give your rule?" The rule is this: Multiply the area of piston by the pressure in pounds to the square inch, and the product by the number of feet traveled by the piston per minute. Then divide this product by the unit for horse-power—33·000—which gives in this case 99·3347 horse-power.

Business and Personal.

The charge for insertion under this head is 50 cents a line.

Wanted—location for Portable Saw Mill—steady sawing, from one to five years. Address Marion Lumber Company, Midway, Washington county, Pa.

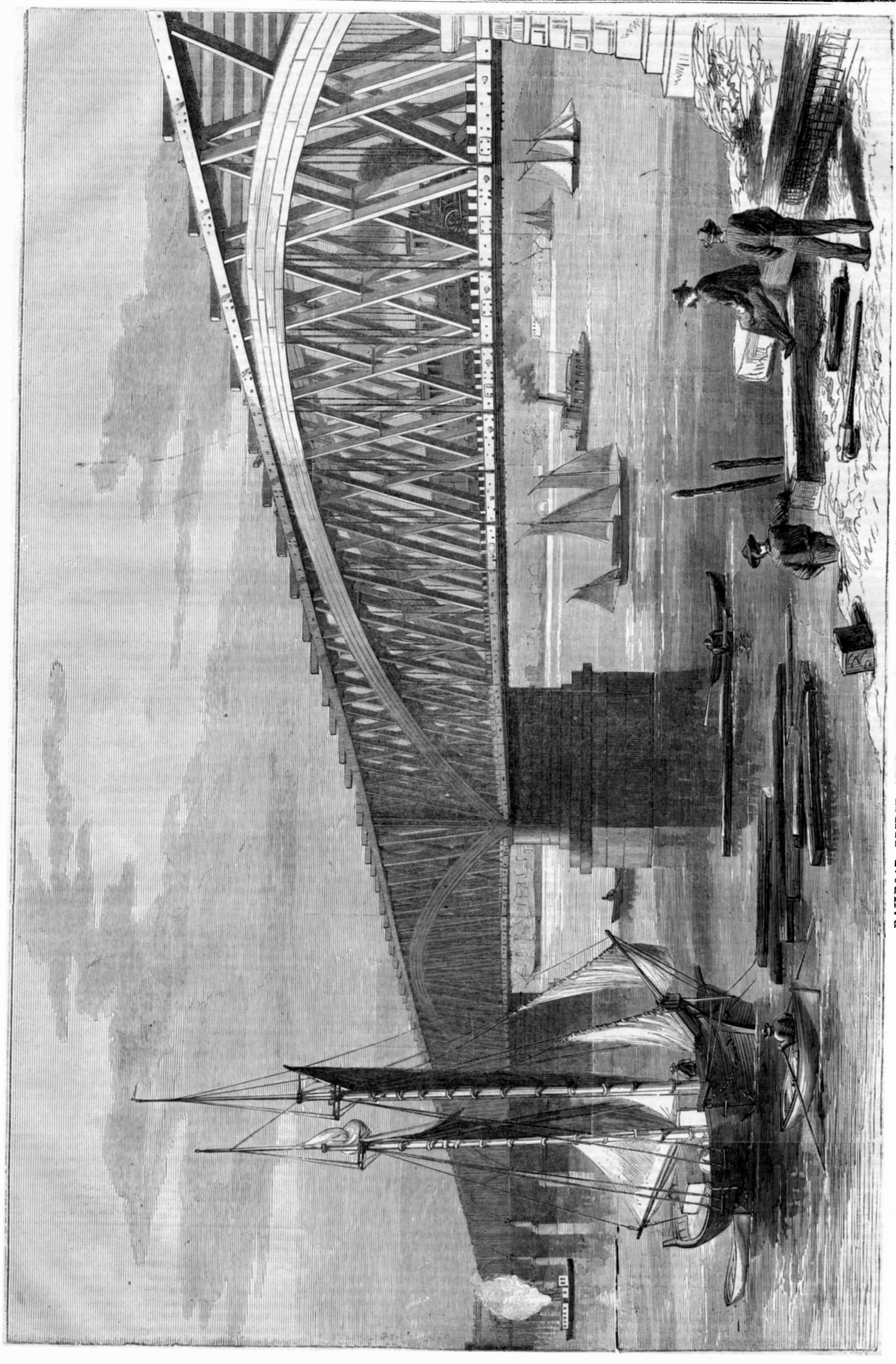
Woolen Mill Wanted at Coloma, Ill. See advertisement and address A. P. Smith, Sterling, Ill.

Manufacturers and Wholesale Dealers in Household Tin ware please send address to Robert Broome, Providence, R. I.

Printing Press Makers will oblige by sending their business card to Richard Yeomans, Printer, Cincinnati, Ohio.

Engine Lathe wanted, second-hand, 6 to 10 feet long. L. F., Box 131, Holly, Mich.

© 1867 SCIENTIFIC AMERICAN, INC



RAILROAD BRIDGE OVER THE SUSQUEHANNA AT HAVRE DE GRACE.

© 1867 SCIENTIFIC AMERICAN, INC

SCIENTIFIC AMERICAN.

MUNN & COMPANY, Editors and Proprietors.

PUBLISHED WEEKLY AT
NO. 37 PARK ROW (PARK BUILDING), NEW YORK.

O. D. MUNN. S. H. WALES. A. E. BEACH.

☞ "The American News Company," Agents, 121 Nassau street, New York

☞ Messrs. Sampson Low, Son & Co., Booksellers, 47 Ludgate Hill, London England, are the Agents to receive European subscriptions or advertisements for the SCIENTIFIC AMERICAN. Orders sent on them will be promptly attended to.

☞ Messrs. Trubner & Co., 60 Paternoster Row London, are also Agents or the SCIENTIFIC AMERICAN.

VOL. XVI., No. 22....[NEW SERIES.]....*Twenty-first Year.*

NEW YORK, SATURDAY, JUNE 1, 1867.

Contents:

(Illustrated articles are marked with an asterisk,)

*Improved Hay Fork and Stacking Apparatus..... 341
How Money Can Be Made..... 341
Synthesis of Organic Compounds. 341
*Pillsbury & Milliken's Stovepipe Fastener..... 341
Varieties of the Exposition..... 342
Editorial Summary..... 343
*Combined Table, Cupboard, and Clothes Rack..... 344
Re-inventions..... 344
Petroleum as a Painting Oil..... 344
Steamship Economy..... 344
*Improvement in Car Trucks..... 345
Petroleum as a Fuel..... 345
*Steam Boilers—Their Form, Construction, and Material..... 345
English and American Guns..... 345
Hints to Inventors on the Destruction of the Potato Bug..... 346
Kerosene and Caterpillars..... 346
Business and Manufacturing Items 346
Mining Intelligence..... 346
Galand's New Breech-Loader..... 346
Recent American and Foreign Patents..... 347
Answers to Correspondents..... 347
*"Four Years' Work of a Thousand Men",..... 348, 349
The Vocation of the Engineer..... 349
The Belt Question..... 349
Expenses of a Weekly Newspaper 349
The New Steam Gun Carriage..... 350
Gleanings from the Polytechnic Association..... 350
Machine Tools..... 350
Telescopic Discovery..... 350
Patent Claims.....351, 352, 353, 354
Inventions Patented in England by Americans..... 354
Extension Notices..... 354
New Publications..... 354

CAUTION.

It has become necessary for us to state very distinctly that the Scientific American Patent Agency Offices are at No 37 PARK ROW, and not at No 39.

THE VOCATION OF THE ENGINEER.

Until within a few years the ultimate object of the recipient of a collegiate education was admission to the pulpit, the bar, or the domain of medicine. In fact to "go to college" implied an intention to become a "minister," a lawyer, or a doctor; but this has changed, and it is now not uncommon for graduates of our collegiate institutions either to settle down as mechanics or attempt the *role* of the journalist, the last position being one which they do not always fill with credit to themselves or advantage to the public.

But there is the vocation of the engineer which now opens a large field for educated young men. In England for many years the business of the civil and the mechanical engineer has been one of importance and lucrative. "Internal improvements," here some years ago a political catch-word, is there an established fact. Engineers in England have been for many years and still are highly valued, and their services are eagerly sought after in more than one department of the arts. It is beginning to be so here. Educated men capable of understanding those principles of science which lie at the foundation of the mechanic arts and who have a practical knowledge of those arts are greatly in demand. The extentensive works which are continually being undertaken by the government, corporate bodies, and individuals require for their successful prosecution talent, accurate knowledge, and perseverance, if not genius.

The rapid and general application of machinery to every department of industry, the employment of steam for so many purposes, the improvements in our means of communication open a field much too large for the laborers who are fitted to till it. The single department of architecture is demanding the most thorough knowledge of its laws and the talents of the best minds. In the construction of bridges, causeways, tunnels, roads, the designing and building of steamships with their huge machinery, the introduction of supplies of water to cities and villages, and many other works of a public and extensive character, something more than mere muscle or mechanical ability is called for. It demands intellect—the brain force—which in these operations is the prime mover.

Manufacturing establishments, which now are projected on a gigantic scale, often involving the expenditure of hundreds of thousands each, must be planned and controlled by comprehensive minds, thoroughly schooled to an intimate knowledge of mechanical causes and results. Mistakes in such works, arising from ignorance or incompetence, although under other circumstances trivial, may ruin an enterprise undertaken on a grand scale.

While we need more first class mechanics, capable of doing as well as directing, we require not less the planning and management of educated engineers, men who do not commit errors nor produce abortions. Proofs of this statement abound on every hand. The experiments of empirics without a particle of science—charlatans in mechanics—are altogether too common. Experiments are valuable only when guided by fixed principles and a knowledge of law, and this knowledge is attainable and should be gained by every one who aspires to a position of eminence either in mechanical or civil engineering.

For such a position a collegiate course is not always necessary; indeed, several of the most eminent engineers have been and are self educated. But the education is essential, whether obtained in the walls of a college or in the garret. There are not many young mechanics who do not have such an education within their reach. Time and a spirit of application are the chief requisites, and there are few boys or apprentices who have not the one and cannot cultivate the other. The opportunity is theirs, and certainly the incentive is not wanting. Already the vocation of the engineer is both honorable and profitable, and is rapidly becoming more so in both respects, while the study which prepares for it and the practice of the profession is singularly seductive and interesting.

THE BELT QUESTION.

On this subject we have received several communications, those from practical mechanics, with only one exception, endorsing our ideas expressed in our issues of February, 16th, March 30th and April 13th. We select from one of the many which agree with us the leading ideas, and give the amount of that one which objects to our misunderstood position.

W. H. B., of Mass., says: Your theory in regard to centrifugal force is unquestionably correct, but is it sufficient to account for the action of the belt? In any ordinary case is this force sufficient to overcome the tension of the belt? Let any one take a cone and wind upon it a strip of paper, or ribbon, beginning by holding the strip at right angles with the axis of the cone, the cause of the action of the belt will be sufficiently apparent without the aid of the centrifugal theory. I think a narrow or round belt would be subject to the same law as a wide one, etc.

J. W. T., of Ohio, says: Let any one take a cone (a tapering vial served my purpose,) and wind a strip of paper around it, commencing at the small end, and observe how rapidly it begins to approach the larger end if allowed to take its own course. In my opinion a belt runs to the largest part of a pulley for the same reason. The belt being endless and restrained by the other pulley, cannot follow this inclination as the paper can, but the tendency to do so causes it to curve edgewise slightly toward the largest diameter of the pulley, and this changes the direction of its motion just before it comes in contact with the pulley.

When we answered our correspondent in our issue of Feb. 16, we had no idea of accounting for every case of the running of belts. We said simply this; that "the *tendency* of belts as of a liquid on a revolving shaft is by centrifugal force to traverse the part furthest from the center." We did not say that no other element but centrifugal force entered into the problem. We merely stated that centrifugal force exercised a *tendency* to carry the belt to the highest point. No observant, practical mechanic will deny this. although theorists without practical knowledge may pit their notions against established and easily ascertained facts.

In reply to a correspondent we said, in our issue of March 30, "if only the stretching of the belt's edge compels it to traverse the highest point, it would seem that one edge being once curved, the time could not arrive when the strain would become equal on both edges, unless the belt passed its width entirely over the highest part of the pulley, when the belt would have attained its normal condition of straightness and again repeat the process of traversing transversely indefinitely." Again, in our issue of April 13th, we say: "the idea that the tendency of a belt to work to the highest portion of a pulley is caused solely by the stretching of one of its edges, does not appear to account for every case."

It will be seen that we did not offer the centrifugal theory as an *adequate* reason for the running of belts on the highest part of a pulley, but only as *one* of the reasons—that this force created a *tendency* in this direction. Both the correspondents whose articles we have used offer the same illustration, and both are wrong. They wind a ribbon on a cone and say that as the increasing diameter of this cone will take up an increased amount of this ribbon, therefore the running of a belt on the highest diameter of a pulley is accounted for. One, W. H. B., says the yielding nature of the substance of which belts are made will account for this movement toward the higher surface, or the larger diameter. Suppose he takes a steel tape, unyielding, the result in winding on a cone would be the same.

But it is one thing to wind a tape or ribbon on a fixed cone and another to run a belt on two pulleys revolving. In the one case there can be no centrifugal force; in the other there may be much. Whatever unpracticed theorists may affirm, every mechanic who has had experience with belts and pulleys knows, or may know, that centrifugal force—the power developed by rotation—has something to do with the running of belts, and this force is developed, in a measure, on slowly revolving shafts, and not entirely confined to those of rapid revolution, although in one case we may not be able to see the effect so apparently as in the other.

Other communications have been received on this subject, but as those from which we have quoted contain the ideas of the rest, there is no necessity of referring at length to them. If the stretching of a belt's edge alone accounts for the tendency to traverse the greatest diameter, why should not slow moving belts thus tend to that position? In one hundred revolutions performed in thirty minutes certainly a belt would stretch more than in one hundred revolutions performed in one minute; yet the slow moving belt will not tend to the crown of the pulley so much as the rapidly moving one.

EXPENSES OF A WEEKLY NEWSPAPER.

Few are aware of the expenses of publishing a leading weekly newspaper. We recently took occasion to sum them up, for one week's issue of the SCIENTIFIC AMERICAN—and it is the average of every week—and here give the figures for the benefit of any one contemplating a similar enterprise:—Editorial assistants, correspondents and reporters, $165; engravings, $240; composition (type setting) and proof reading, $150; paper (2½ tuns), $1,100; press work (printing), $175; envelope paper, wrapper writing and other mailing expenses, $110. Total per week, $1,940; total per year, $100,880.

The above being exclusive of office rent, heating, etc., and of the expense of conducting our extensive patent agency, which amounts to a much larger cost than that of publishing the paper. It will be apparent to our readers, as it is patent to us, that so large and handsomely illustrated sheet can be furnished at the low price of $3 per year only by having a very large subscription list. And it is by industry and energy on the part of its proprietors, for the past twenty-two years, that the SCIENTIFIC AMERICAN has attained its very large circulation, which is at least tenfold greater than that of any other paper of its kind in the world.

"FOUR YEARS' WORK OF A THOUSAND MEN."

The Susquehanna Bridge at Havre de Grace, an engraving of which appears on page 348, connects the hitherto severed portions of the Philadelphia, Wilmington, and Baltimore Railroad. It is located about half a mile above the mouth of the Susquehanna River, and about one quarter of a mile below the point of Watson's Island.

The line of bridge, which is a continuation of the line of railroad on the east side of the river, is at right angles to the general line of the stream. The river at this point is divided by the bar extending southerly from Watson's Island into two channels, the easterly of which has a depth of forty-nine feet, and the westerly of twenty-five and one-half feet, while at the point where the bridge crosses the bar the greatest depth is but five and a half feet below low water.

The piers which support the superstructure are thirteen in number and are of stone carefully laid in cement, within caissons of boiler iron which reach a point above the line of running ice. From this hight the piers are finished with cut stone laid in courses. The draw pier (No. 8) is circular, with a diameter of twenty-four feet eight inches at the top of the caisson, while each of the other piers has a width of eight feet and a length of thirty-five feet four inches at top of caisson, and a width of seven feet three inches at top of cut stone. Beside the piers which carry the superstructure, there are at the draw two guard piers, one above and one below, which serve to protect the draw from injury and to aid vessels in passing.

The piles for the pier No. 3, in the deepest water built in, were leveled at a depth of thirty-eight feet and five inches, and the piles for the pier No. 4, in the shoalest water built in, were leveled at a depth of four feet eleven inches below low water.

The abutments, two in number, are of cut stone. From low water to under side of chords at abutments is twenty-five feet eight inches, and the bridge rises by a regular curve from each abutment toward the center, making the distance from low water to under side of chords at piers Nos. 7 and 9, twenty-seven feet six inches.

The superstructure, which is for a single track, is of wood, built mainly on the Howe plan, with arches, and consists of twelve spans of two hundred and fifty feet nine inches very nearly in the clear, and a draw of one hundred and seventy-four feet nine inches.

The whole distance between abutments is three thousand two hundred and seventy-three feet and nine inches. On the west side of the river the bridge is connected with the old track by a piece of double-track road three thousand feet long.

The charter of the Susquehanna Bridge was obtained of the Maryland Legislature at the session of 1853. Surveys and examinations of different lines were made, and the building was begun in the same year, but in 1854, after some piles had been driven and some materials purchased, the work was suspended until 1862.

1862. Between the middle of June and the end of November full examination of the bed of the river was made, the plan of the piers was decided upon, the piles for piers 3 and 4 were driven and sawed off, and a portion of the masonry in caisson of pier 4 was laid.

1863. Work was resumed early in June and carried on until the end of December. During this season the whole of the masonry in caisson of pier 3 was laid, and a part of that above, the piling for pier 2 was begun, and the piles for piers 5, 6, and 7 were driven and sawed off.

1864. Work was resumed early in April and carried on until the latter part of December. During this season the piles for the east abutment were driven and sawed off, and a part of the masonry laid, piling for pier 1 was begun, piling at pier 2 was finished and sawed off, and the larger part of the masonry in caisson was laid; at piers 5 and 6 all of the masonry in caissons was laid, and the larger part of that above, and the foundation of west abutment was begun.

1865. Work was resumed in the latter part of March and continued until the end of December. During this season more masonry was laid at the east abutment, piling at pier 1 was finished and sawed off, and the whole of the masonry in the caisson, and the whole of that above it was laid; at pier 2 the rest of the masonry in caisson and the whole of that above was laid; at pier 3 more of the masonry above caisson was laid; at pier 4 the rest of the masonry in caisson and all of that above was laid; at piers 5 and 6 the rest of the masonry above caissons was laid; at pier 7 the foundation, the whole of the masonry in caissons and a part of that above was laid; at pier 9 the foundation and the whole of the masonry in caisson and the whole of that above was laid; at pier 12 the foundation and the whole of the masonry in caisson was laid; at pier 13 the foundation, the whole of the masonry in caisson and a part of that above was laid; at the west abutment the whole of the foundation was finished and a part of the masonry laid, and spans 1 and 2 of superstructure were framed and finished.

© 1867 SCIENTIFIC AMERICAN, INC

1866. The work was hardly interrupted by the winter. During this season the masonry of the east abutment, of piers 3, 7, 12, and 13, and of the west abutment was completed; at piers 8, 10, and 11 and at north guard pier the foundations, the whole of the masonry in caissons, and the whole of that above was laid; at the south guard pier the foundation was laid and the masonry completed above high water.

Spans 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, and 13 of superstructure were framed, and spans 3, 4, 5, 6, 7, 10, 11, 12, and 13, and the bottom chords of span 9 were raised, when by a tornado on the 25th of July the whole of the superstructure except span 1 and the bottom chords of span 9 was torn from the piers and destroyed.

Spans 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, and 13 were subsequently framed and raised so as to allow the crossing of a locomotive on the 20th of November, and on the 26th of November the bridge was so far completed as to allow of its being formally opened for travel. Since the opening of the bridge the work of completion has steadily progressed, and is now nearly finished, except the iron covering of the trusses, and the iron second story of the abutments, which are designed to flank the superstructure. These pieces of work will not be completed before another year.

The unstable nature of some parts of the bed of the river, together with the unusual depth of the water and the occasional violence of the ice freshets at the site of this bridge, are what have given the work a character of unusual engineering difficulty. The mode of constructing the piers was especially designed to meet this difficulty, and it has answered its purpose very perfectly. The masonry was laid within wrought iron water-tight caissons, which were fastened to timber platforms, and lowered gradually with the building of the masonry to prepared foundations of piles. The lowering was in some cases assisted by screws, and in others guided to the bottom by temporary guide piles. One of the piers was lowered by means of six 3½-inch screws, fifty-six feet long, to a pile foundation in water generally over forty feet deep.

The bridge was built after the plans and under the superintendence of Mr. George A. Parker, C. E., and receives the highest commendations of eminent engineers. It has been tested by a load of four times the weight of any train that can ever pass over it. Its cost was about $1,500,000, an immense amount for a single transit structure on a road of only one hundred miles, but the public will be great gainers in the shortening of the time of travel between Philadelphia and Baltimore, and in the absence of the danger to which all have felt exposed in making the passage on the immense train ferry-boat hitherto used.

THE NEW STEAM GUN CARRIAGE.

An interesting trial of the broad-side gun carriage, invented by James B. Eads, of St. Louis, took place last Thursday, in the presence of Commodore H. A. Wise, Chief of the Ordnance Bureau; Capt. Mullany and Commodore Buckner, ordnance officers of the navy; Mr. I. W. King, Chief Engineer of the Brooklyn Navy Yard, and Cols. Crispin and McAllister of the ordnance corps of the army.

The carriage supports one of the fifteen-inch navy guns weighing about 46,000 lbs. A steam cylinder 11 inches in diameter and 6 feet 4 inches stroke of piston, is secured between the gun slides of the chassis or lower carriage and parallel to them. The piston rod runs out in the direction of the port or muzzle of the gun, and is attached by its crosshead and connecting rods to the upper carriage which moves on the slides immediately over the cylinder. By a lever at the rear of the carriage steam is admitted to either end of the cylinder through a slide valve. The steam from the boiler is introduced into the carriage and exhausted from it, through the pivot on which the carriage is trained. A stop valve prevents the return of the steam to the boiler when under the compressing force of the recoil.

The gun was moved back and forth with great ease and rapidity, and was checked at each end of the stroke by the steam. When the gun is run into battery it is held there by the force of the steam in spite of the rolling of the vessel, until it is discharged or brought back by the operator. When the gun is fired the piston is sent back against the steam which cannot escape until the recoil is entirely checked. At this moment a self-acting device reverses the valve, the compressed steam is allowed to escape and steam from the boiler is introduced in the other end of the cylinder, causing the gun to start again in the same direction of the recoil, but at a gentle speed, until it is left completely at rest at the end of the stroke where the carriage comes against gum-elastic buffers. It is here held by the steam until the gun is reloaded when the operator runs it out again at will.

Solid shot were used weighing about 450 lbs., and a number of charges were fired varying from 35 lbs. to 55 lbs. each, of gunpowder of nearly twice the strength of the large grained cannon powder recently used in the experiments at Fortress Monroe. Four shots were fired against time in less than five minutes, one of them occupying but 45 seconds to load and fire.

The ball is raised by an ingenious device to the muzzle of the gun, by steam, where it is rolled into the bore of the gun by the men. To put the shot on the shot lifter and deliver it at the muzzle, required but six seconds of time..

A pressure gage and a pressure valve like the common lever safety valve were provided to test the pressure of steam in the cylinder. The initial pressure was 100 lbs. The cylinder was calculated to stand 2,000 lbs. per square inch.

The weight was placed on the lever of the valve at 400 lbs. The 45-lb. charges caused a pressure of 260 lbs. to be shown by the steam gage. The valve was unmoved. The concussion of the first 50-lb. charge broke the glass over the dial plate of the gage and disarranged it so that it was of no further use. The pressure valve was opened but whether from the effect of the steam pressure or from the jarring of the lever and pe was not fully determined. The pe was then set to indicate 500 lbs., and the valve was undisturbed until 55-lb. charges were used, when it was again opened. The pe was again moved out until a pressure of 700 lbs. was shown by it. Several charges of 55 lbs. were fired, and the inventor proposed to test it with 60-lb. ones. The Chief of the Bureau, however, was satisfied with the successful performance of the carriage without subjecting the gun to heavier charges, and expressed his willingness to accept it without further trial. All present seemed to be convinced that this method of working our large guns was the most rapid and reliable yet suggested.

It is to be regretted that more reliable means were not used to ascertain the pressure of recoil in the cylinder, as from such data could be calculated the exact power developed in recoil with different charges. A ball moving at 1,000 feet per second of initial velocity, weighing 450 pounds exerts a force equal to 450,000 foot-pounds. If the gun and carriage weigh 50,000 pounds, they will have an initial velocity of 9 feet per second and a force of 450,000 lbs., which must be absorbed before they are completely brought to rest. It is of course a question of strength of materials and of steam pressure, what size cylinder will be required to do this work. As the gun stands twenty or thirty thousand lbs. to the square inch, it is easy to make a cylinder of strength enough to check the recoil of the heaviest guns. But such data are needed to decide on the requisite diameter, thickness and length of cylinder required and the initial pressure of steam. A cylinder of 16½ inches diameter would have had only half the pressure withstood by the one in the trial. Compressed air can be used instead of steam, if desired, to work the gun.

GLEANINGS FROM THE POLYTECHNIC ASSOCIATION.

An item read by the chairman on the cure of hydrophobia, prescribing the rubbing of the wound with crystals of nitrate of silver, called forth some remarks as to the cause and treatment of the disease. Mr. Page believed it to be a nervous affection, and that a sudden and involuntary plunge of the patient into cold water would effect a cure. A member suggested that the experiment might be tried this summer on rabid dogs in confinement, for the possibility of securing a remedy is worthy the making of some such trials for testing its value. Mr. Reed narrated a case which came under his knowledge, where lockjaw in a jackass was perfectly cured by suddenly throwing the animal into cold water.

A microscope fitted with a Nicol's prism was exhibited, and its value to the chemist, in detecting in an analysis by means of polarized light minute organic salts, was fully set forth. The process of taking micro-photographs was explained, and some pictures of trichinæ, taken from pork and also the muscles of a human body, were shown.

Mr. Wright explained by means of a model the construction of a new life raft whose chief merits, beside its buoyancy were its light weight, its cheapness, and its compact form when not in use. The raft consists of six water tight cylinders of convenient size, connected together by a trellis framework: over the whole is a light platform of hinged boards. The trellis and platform may be folded up when not required for use, so that four of these rafts, each capable of saving fifty passengers, occupy no more space than one ordinary ship's boat. The standards which support the life lines, act also as bolts to connect the pontoon and deck. A mast and sail may be rigged at leisure after launching. The provision tank is so arranged that sea water can never injure the food.

Dr. Rowell explained a new process of making oval picture frames, of curved veneers of black walnut, whereby the same shade and gradations of color are continuous throughout, and a frame of great beauty and strength is cheaply made.

Dr. Bradley followed with an elaborate essay on electricity and telegraphic instruments. He entered into a minute description of the several galvanic batteries employed in telegraphy, pointing out the defects of each, and referring particularly to the merits of Hill's battery, now coming into general use. The remainder of this voluminous paper was substantially a repetition of the article read at a meeting of the Association some months since, in connection with the presentation of his anthistometer, or measurer of resistance, and reported at length in these columns at that time. The speaker introduced an imposing array of figures and formulas unintelligible to the majority of the audience, by way of proving the truth of Ohm's law concerning the retarding power of the electrical battery.

After a brief dissussion of Dr. Bradley's paper the Society listened to the reading of an article by Dr. Feuchtwanger on gypsum, its nature, geological formation, and the region of country through which it is found. These remarks were preliminary to an account of a late visit to the immense gypsum deposits near Windsor, Harts county Nova Scotia. The gypsum beds of this vicinity is one hundred and fifty feet wide, and probably not less than fifty miles in extent, this being the largest deposit in the world. From this locality, he stated, 100,000 tuns of plaster of Paris are annually exported.

ELECTRICAL ANTI-INCRUSTATORS.

The first application of electricity to steam boilers was made by Mr. Perry of Philadelphia, who in 1864 petitioned for a patent for suspending a magnet in the boilers to induce an electric current and thereby to prevent boiler explosions. Electricity and magnetism considered by him as identical, have too often been confounded; though indeed related, as are light and heat, it would be equally absurd to attempt the illumination of a room from boiling water as to admit the claims of this inventor in getting electricity from a magnet. Rejected on his first application, a patent was finally granted to him in 1865. On the same month a patent was also issued to Mr. Porter of Philadelphia, for getting rid of the explosive electricity. An unexpected result, it is asserted, was obtained by the use of this invention, namely, the boilers remained free from incrustations. Some fifty years ago Humphrey Davy sought to prevent corrosion of the copper coating of vessels by sea water, by soldering pieces of zinc against the copper sheathing. A galvanic current was set up which preserved the copper at the expense of the zinc but as a set-off to this protection, it was found that deposits of marine vegetation, were always formed against the copper. A few years ago, Webster and Young applied this principal for preventing boiler incrustation. A plate of copper suspended in the water, would, it was expected, by galvanic action receive the salt from the water, as the copper coating took up the ocean deposits, but as this deposit on ships was formed at the expense of the zinc, so here the iron was corroded and destroyed.

These remarks were prefaced by Prof. Vander Weyde, to the presentation of a plan of his own for establishing simple electric repulsion between the shell of the boiler and the particles of solid deposit, so that they are prevented from adhering to the boiler. It is a well known fact that that vapor of water containing salts in solution is always positively electric. Most deposits are also positively electric. Now by suspending pointed wires, like lightning rods, from inside the boiler, above the water, the positive electricity from the steam will be collected and again diffused through the boiler, and as electricities of the same name repel each other, the positive electrical salts can not be deposited and incrustation will be prevented.

Machine Tools.

It is remarked in *Engineering*, that the patterns of self-acting tools have acquired within five years a remarkable uniformity all over Europe. At the London Exhibition of 1862, the first signs of this conformity were seen in sets of machine tools from Saxony, which were such close copies of the English as to be hardly distinguishable without close inspection. The Chemnitz manufacturers who began thus, went on, buying the English tools without disguise, copying them with minute fidelity, and even casting direct from their parts In France, the *Conservatoire des Arts et Métiers* began the collection of designs of English machines, and invited all manufacturers to take copies of them. Their complete drawings of the English machines exhibited in 1862, actually included many better and more accurate than the makers themselves possessed. The French makers, however, have departed from the models more frequently than the Germans, with variations which our English contemporary considers mostly clumsy or obsolete. American tools are credited with a more distinct and original character, "placing them on a totally different level from mere imitations," although the excellences of the English styles are not neglected, and several of our makers are said to compare favorably in the present Exposition with any in Europe.

Telescopic Discovery.

We are informed that a new double star, supposed to be below the defining power of more than two or three telescopes in the world, has been observed by means of the fine instrument in the possession of Jacob Campbell, Esq. of Brooklyn. It is almost in a line between Procyon and the companion star by which the defining power of first class telescopes is frequently tested- But although it is a common practice of astronomers to try their glasses by first observing Procyon and then waiting a few minutes for the companion star to come into the field, this new companion, which enters the field before the other, had never been revealed by any of the instruments so often crossed by it. Professor Winlock, the astronomer at Cambridge, was informed of the discovery, and after some search with the fine Munich telescope of that observatory, detected the new star, although at first as elongated, not double. The success of European instruments with the new test, is yet to be heard from. The remarkable quality of Mr Campbell's telescope (a twelve inch lens, three inches smaller, if we mistake not, than that of the Munich instrument at Cambridge) is due to the well known skill of Mr. Clark of Cambridgeport, who has been engaged for months in correcting and perfecting it.

HON. D. A. WELLS, Commissioner of Revenues, sailed on Saturday, 18th inst., for Europe on an official mission. Mr. Wells will visit the large manufacturing towns of England and investigate their system of manufacture, time required of the operatives, their pay and social condition. He will also investigate the English system of raising revenues, all of which will be reported to Congress at the next session. Mr. Wells is a keen observer, an indefatigable worker and a gentleman every way fitted for the important office he so acceptably fills. Mr. Wells expects to return in September.

CHEAP LECTURE DIAGRAMS.—Prof. Kick, of the Prague Polytechnic Institute, proposes the following way of preparing inexpensive diagram boards for lecture-room purposes. A sheet of stout brown paper is first coated with thin glue in which is mixed a quantity of lamp black and powdered pumice stone. After the application of two coats of this composition the design is traced with French chalk, the lines afterward to be gone over with ordinary chalk or colored crayons. To fix the drawing the inventor by means of a "vaporiser" or spray apparatus projects water in a finely-divided state over each line; the glue is thus softened and allows the chalk to sink into it, and when dry forms a protecting varnish. Diagrams so prepared can be rolled up and rubbed without damage, and corrections may be made with great facility.

© 1867 SCIENTIFIC AMERICAN, INC

ISSUED FROM THE U. S. PATENT OFFICE
FOR THE WEEK ENDING MAY 14, 1867.
Reported Officially for the Scientific American

PATENTS ARE GRANTED FOR SEVENTEEN YEARS, the following being a schedule of fees:—

On filing each Caveat	$10
On filing each application for a Patent, except for a design	$15
On issuing each original Patent	$20
On appeal to Commissioner of Patents	$20
On application for Reissue	$30
On application for Extension of Patent	$50
On granting the Extension	$50
On filing a Disclaimer	$10
On filing application for Design (three and a half years)	$10
On filing application for Design (seven years)	$15
On filing application for Design (fourteen years)	$30

In addition to which there are some small revenue-stamp taxes. Residents of Canada and Nova Scotia pay $500 on application.

☞ Pamphlets containing the Patent Laws and full particulars of the mode of applying for Letters Patent, specifying size of model required, and much other information useful to inventors, may be had gratis by addressing MUNN & Co., Publishers of the SCIENTIFIC AMERICAN, New York.

64,618.—CHURN.—William Alexander, Union Valley, N. Y.
I claim the dasher, D E, constructed substantially in the manner herein shown and described and for the purpose set forth.

64,619.—PLOW.—Darwin Almy, Tiverton Four Corners, R. I.
I claim the arrangement of the lever, D, the rod, b, and the links, c c' and g, connected with the guide wheel, E, for regulating the depth of the furrow of a plow, operating as herein described.

64,620.—WELL-BORING AND DRILLING MACHINE.—Charles W. Atkeson, St. Louis, Mo.
I claim the attachment of the chain drum, J, gearing, K L, and wheel, M, to the walking beam, substantially as herein described and for the purpose specified.

64,621.—CATTLE TIE.—E. P. Banks, Portland, Me.
First, I claim the combination of the bolt, d, clamp, a, and bow, b, when constructed as set forth in Fig. 1, for the purposes specified.
Second, The combination of the bolt, d, clamp, a, and bow, b, when constructed as set forth in Fig. 3, and for the purposes specified.

64,622.—VESSEL FOR MALTING AND BREWING.—Chas. Berckhemer, Cincinnati, Ohio.
I claim a perforated bottom or other metallic portion of a brewer's or malt-ster's vessel, composed of cast or wrought iron electroplated, as set forth.

64,623.—BLOTTING PAD.—Reinhold Boeklen, Brooklyn, N. Y. Antedated May 3, 1867.
First, I claim the employment or use of a flexible board or bottom to the blotter, operated and for the purpose substantially as herein described.
Second, The employment of the slides, D D, combined with the wedge-shaped ends of the blotter board, A, operated and for the purpose substantially as herein shown.

64,624.—PAPER FILE.—Reinhold Boeklen, Brooklyn. N. Y.
First, I claim the employment of one or more slides, I, or flaps, K, in combination with the file hooks, operated as and for the purpose substantially as herein shown.
Second, The construction and arrangement of the spring plates, B. and its guide, F, in combination with the back board, A, operated in the manner and for the purposes substantially as herein described.

64,625.—FLOUR BOLT.—Benjamin Boorman (assignor to himself and Isaac Lain), Waukesha, Wis.
I claim the strips, a, of the bolting cloth, E, secured to the parallel arms, D, of the revolving flour bolt, A, by means of the strips, b, in such a manner that the said strips, a, shall be flush with the inner surface of said slats, D, as herein set forth for the purpose specified.

64,626.—CARRIAGE SHACKLE.—James Brennan, New Haven, Conn.
I claim the combination of the two parts, C D, hinged together at the rear, and secured at the front by a screw, E, as and for the purpose specified.

64,627.—POTATO DIGGER.—Thomas and George Burdett, Dansville, N. Y.
I claim the arrangement of the fork, D, with the axle, A, bar, C2, of the frame, C, and wheels, B, when all are constructed and operating as herein set forth.

64,628.—STUMP EXTRACTOR.—David Carroll, Union, Pa.
First, I claim the pulleys, E G and I, in combination with the chains, M and N, substantially as shown and described and for the purposes set forth.
Second, I claim the castors and shoes, R R R, in combination with the derrick, substantially as shown and for the purposes set forth.

64,629.—COTTON PICKER.—J. E. Carver, Bridgewater, Mass.
I claim the reciprocating tongue, B, one or more placed within a box, A, and armed with reflex spines or teeth, and used either with or without the toothed plate, E, substantially as and for the purpose set forth.

64,630.—COTTON PRESS.—F. A. L. Cassidey, Newmansville, Fla.
First, I claim the suspended slotted packing case or cylinder, B, or equivalent, in combination with the frame, A, substantially as herein shown and described.
Second, The combination of the ratchet bar, D, spring, E, and rods, C, with the packing case, B, substantially as herein shown and described.
Third, The combination of the piston head, I, with the packing case, B, and rods, C, substantially as herein shown and described.
Fourth, The construction and arrangement of the bottom, F, hinge, G, and catch, H, on the lower end of the packing cylinder, B, as herein set forth.

64,631.—WAGON-WHEEL LOCK.—Thomas G. Clifford, Derby, Conn.
I claim the arrangement of the bolts, I, in combination with the plates, F and the shaft, G, with its ratchet, h, constructed and arranged to operate substantially in the manner herein set forth.

64,632.—BEDSTEAD.—George G. Cochran, Brooklyn, N. Y.
I claim the rods, D D', at each side of the bedstead, provided at their inner ends with right and left screw threads, connected by nuts, E, and attached to their outer ends to the posts, A, by the hooks and eyes, c d, and the knobs, e, and hooks, f, in combination with the tenons, b, on the ends of the rails, c, and the mortises, a, in the posts. A, substantially as and for the purpose set forth.

64,633.—SLEIGH BRAKE.—Frederick Cohlmeier, Keck's Center, N. Y.
I claim, First, An improved sleigh brake formed by the combination of the draft bars, F, supporting bar, G, bent levers. H, and dogs, I, with each other, and with the frame and tongue of the sleigh, substantially as herein shown and described and for the purposes set forth.
Second, The combination of the bar, M, and levers, N, with the draft bars, F, and with the frame of the sleigh, substantially as herein shown and described and for the purpose set forth.

64,634.—SPRINGS FOR VEHICLES.—D. L. Columbia, R. V. Stocking, and C. W. Woodruff, Morrison, Ill.
We claim, First, Suspending the bodies of vehicles upon bands of india rubber, so applied that the action of the load shall take effect in the elongation of the springs, and it be raised by their contraction, substantially as described.
Second, The combination of the india-rubber bands, H, standard, D, and oscillating lever, E, substantially as and for the purpose set forth.

64,635.—LOCK FOR CAR DOORS, ETC.—George B. F. Cooper New Albany, Ind.
I claim the catch bolt, D, in combination with the sliding bolt, B, operated by the thumb pawl, c, to lock or secure the fastening without employing a key, arranged substantially as herein described.

64,636.—METHOD OF TRANSPORTING CARS THROUGH TUNNELS.—John H. Crane, Charlestown, Mass.
I claim the method of transporting cars through tunnels, by means of traversing cars, having rails upon their platforms, which rails connect with the railway tracks at the opposite ends of the tunnel, substantially as set forth.
I also claim making the cars, c, sectional and jointed, substantially as described.
I also claim the hinged or swinging rail platform, h, made to swing up from, or to be swung over upon the cars, substantially as described.

64,637.—PRESSING BRICKS.—Horace Crofoot, Oak Park, Ill., assignor to himself and T. W. V. P. Mercereau.
First, I claim the fixed mold plate, J, and reciprocating plungers, F I, when arranged to operate as shown, or in an equivalent manner, so that the clay after being subjected to one pressure in the molds, f, will be raised therein to their wider parts, and subjected to a gradual pressure by both sets of plungers, in order to expel the atmospheric air from the clay, substantially as described.
Second, Providing the upper plungers, F, with convex faces, d, when said plungers, thus constructed, are used in connection with molds, f, having inclined sides, and also used with a set of lower plungers, I, to raise the clay in the molds, after being subjected to one pressure, substantially as and for the purpose set forth.

64,638.—COATING FOR IRON SHIPS AND OTHER STRUCTURES.—Francis Cruickshank, Edinburgh, Great Britain.
I claim the preparing of an improved anti-folding coating, with the mercurial compounds hereinbefore specified, and substantially in the manner hereinbefore described.

64,639.—GUARD FOR RAILWAY CARS.—Felix Manuel Daunoy, New Orleans, La.
I claim the application of a gum rubber drum in front of every wheel of a horse or steam car, as herein described.

64,640.—CAR TRUCK.—J. Q. A. De Huff, Summitville, Iowa.
I claim the arrangement of the double-cogged segments, e, hung in the cross frame, F, between the curved guides, E, combined with the springs, d, slot, c, racks, g, the boxes, b, and the axle, C, arranged and operating substantially as and for the purpose described.

64,641.—FIELD FENCE.—Frederick Dickinson, Geneva, Ohio.
I claim the special construction and arrangement of a fence for the purpose and in the manner set forth.

64,642.—CAR WHEEL.—John V. Dinsmore (assignor to himself and Moses Harris), Milford, Mass.
I claim the arrangement of the elastic packing or ring, B, the inelastic tire, C, the body, A, the end supporters, D E, and devices substantially as described, or their equivalents, for preventing the tire from slipping around on the elastic ring, and enabling such tire to vibrate and play in radial directions, as specified.

64,643.—SAW.—Henry Disston, Philadelphia, Pa.
I claim the recess, e, in the blade, for the reception of a detachable tooth, in combination with holes, t t, bored in the blade, and arranged in respect to the corners of the said recess, substantially as and for the purpose herein set forth.

64,644.—UTERINE SUPPORTER.—D. Dodge, M. D., Rockford, Ill.
I claim the sleeves, D and C, jointed to the pad, in combination with the tube, B, and springs, H I, substantially as and for the purpose set forth.

64,645.—CUPOLA FURNACE.—James Dougherty, Philadelphia, Pa.
First, I claim a cupola or blast furnace, the interior of the lower portion of which is composed of the chamber, G, with vertical walls, and above the latter the basin-like chamber, F, constructed at the top, all substantially as specified.
Second, The combination with a cupola or blast furnace of a system of tweers having openings so arranged as to discharge a blast of greater volume below than above, as set forth.
Third, The air openings, w, arranged in respect to the projections, m, and basin-like chambers, F, as described.

64,646.—OIL CUP FOR MACHINERY.—William Douglas and H. M. Ingler, Bellair, Ohio.
First, We claim the cone-feeder, D, constructed and arranged substantially as described for the discharge of the oil upward by the motion of the engine crank.
Second, We claim the arrangement substantially as herein described for oiling the wrist-pin directly in combination with an upward feeding oil-cup

64,647.—PLOWS.—James C. Duncan, Olney, Illinois.
First, I claim a plow, embracing the mold board, A, landside, B, border, or sole, C, and heel brace, D, all being united in one end, and the same piece of metal which is cut and shaped substantially as described and represented.
Second, I claim the slotted rest, D', when formed in one piece with the plow, and employed for the support of the beam, G, substantially as and for the purpose specified.

64,648.—PORTABLE FENCE.—James C. Duncan, Olney, Ills assignor to himself and J. B. Alexander, Washington, D. C.
I claim the supporting trestle, consisting of the battens, C C, braces, E E, pins, D, rails, A, and cross-tie, F, combined substantially in the manner and for the purpose specified

64,649.—LINIMENT.—James C. Dustan, New Vernon, N. J.
I claim an improved liniment, composed of the several ingredients combined in the proportions and manner substantially as and for the purposes herein specified.

64,650.—BREECH-LOADING FIRE-ARM.—Julius Elson, Boston, Mass.
First, I claim the combination, as well as the arrangement of the advancer, H, and its cam, q, or operative mechanism with the hammer and the breech block applied to the barrel and stock, and with the mechanism as described for elevating or depressing the breech-block, C, and bolting and unbolting it with respect to the barrel substantially in manner as specified,
Second, I also claim the combination as well as the arrangement of mechanical parts or instrumentalities for elevating and depressing the breech block, C, and bolting and unbolting it with respect to the barrel in manner as set forth, such parts or instrumentalities consisting in the hammer, E, its pin, f, and arm, g, the lever or arm, e, stud, e, spring, D, the bolt, F, and its operative mechanism, substantially as described.

64,651.—CHERRY SEEDER.—Lot P. Evans, Springville, Pa.
I claim the cylinders, b b', and the plates, d d', arranged and operating with respect to each other, substantially as herein specified and described.

64,652.—COMBINED TOOL.—Gilbert J. Ferriss, Washington, D. C., assignor to himself and Byron Sykes.
I claim the tool as above described, operating in the manner and for the purpose set forth.

64,653.—ENVELOPE.—Edward Fitzki, Washington, D. C.
I claim the application of incisions in the envelope of any size, style or materials as fully described as above.

64,654.—INSULATOR.—George Floyd, Cincinnati, Ohio.
I claim the chambered insulator provided with ledges, H H', approached by a flarring aperture, F, in the described combination with the two parted and shouldered shank, the said shank and chamber being oblong in their horizontal section all substantially as set forth.

64,655.—ROAD SCRAPER.—P. S. Foster, Richmond, Maine.
I claim, First, An improved scraper, A, having tilting or pivoted bottom board, a2, and being adjustably pivoted to the runners, B, constructed and operating substantially as herein shown and described and for the purpose set forth.
Second, The combination of the inside scraper, G, and pinted rods, g2, with the scraper, A, substantially as herein shown and described and for the purpose set forth.
Third, The combination of the crank-shaft, H, and ropes or chains, I, with the scraper A, and inside scraper, G, substantially as herein shown and described and for the purpose set forth,

64,656.—PIPE WRENCH.—Moses H. Freeman, Somerville, Mass.
I claim the combination as well as the arrangement of the clasp, D, and spring, H, the tooth, a, the series, C, of notches the jaws, E A, and the bar B.
I also claim the combination as well as the arrangement of the lever, F with the clasp, D, the spring, H, the tooth, a, the series, C, of notches, the jaws, E A, and the bar, B, such bar being provided with a handle, and the whole being constructed so as to operate substantially as hereinbefore explained.

64,657.—CULTIVATOR.—Andrew Friberg, Moline, Ills.
I claim securing the share to the stock by means of the block, C, and stirrup, e, when said parts are constructed and arranged substantially as herein shown and described.

64,658.—BENCH-VISE.—Charles R. Gibson, Madison, Ind.
I claim, First, The combination of the jaws, A A', with the universal jointed vise screws, B C D, and nut, F, all constructed and arranged substantially as described.
Second, The combination of the jaws, A A', the stirrup, f f, block, G, and pin, K, all constructed and combined as set forth.

64,659.—FIRE-PROOF CEILINGS AND ROOFS.—Joseph Gilbert, Philadelphia, Pa.
I claim, First, A ceiling or roof composed of girders, A, corrugated arched plates, B, and socket bearers, d, adapted to the said girders and plates, the whole being constructed and arranged substantially as described,
Second, In combination with the above, I claim the bricks or blocks, X X, applied in the manner and for the purpose described.

64,660.—ROD CUTTER.—J. E. Gillespie, Boston, Mass.
I claim a rod cutter constructed and operated substantially as specified.

64,661.—WINDMILL.—C. C. Gish, Virden, Ills.
First, I claim a wind wheel constructed substantially as shown and provided with hinged wings, d, and rods, e, sliding hubs, D E, arranged in relation with water receiver, L, and loaded lever, G, substantially as shown and described for the purpose specified.
Second, The float, P, in tank, Q the valve, N, in the water-receiver, L, and the lever, G, all arranged to operate in connection with the wind-wheel, substantially as described,

64,662.—COMBINED HAMMER, SCREW-DRIVER, AND WRENCH.—Willis D. Gold, Philadelphia, Pa.
I claim a combined hammer, screw-driver, and double wrench having the characteristics and operating substantially as represented and described.

64,663.—FLOAT VALVE.—J. H. Guild, Rupert, Vt.
I claim the arrangement in the perforated vessel, A, of the float, B, having the perforated or notched vertical rod, b, engaging with the pivoted oscillating lever, e, connected by the link, d, to the lever, e, pivoted to the opposite side of the vessel, in such a manner that as the float, B, is elevated by the water, the projection, f, upon said lever, e, presses against the elastic pipe, C, effectually closing the same, substantially as described for the purpose specified.

64,664.—NIPPER.—Thomas G. Hall, New York City, assignor to himself and C. E. McDonald, Brooklyn, N. Y., said C. E. McDonald assignor to E. Harvey Gifford, Brooklyn, N. Y.
I claim the lever, D, handles, F and F, toe, b, spring, t, jaws, B C, set screw, h, constructed, arranged and operating substantially as and for the purpose described.

64,665.—TURN-TABLE.—Freeman Hanson, Buxton, Maine.
I claim the arrangement of the plate, c, having its projections, f, its part, h, and wheels, d, plate, b, and projection, g, all as and for the purposes described when the said plate, c, is operated by means of the four screws, k, in the manner herein set forth.

64,666.—ATTACHING AND DETACHING HORSES, ETC.—John K. Harris, Madison, Ind.
I claim, First, The horse-hitching device releasible by the driver, consisting essentially of the hooked plate, B, self-engaging bolt, E, and buckle, R, substantially as set forth.
Second, The buckle proper, consisting of the double tubular frame with the pair of spiral springs, P P', and the draw-bar, O, substantially as described.

64,667.—DESTROYING INSECTS ON TREES.—James Hatch, Lynn, Mass. Antedated May 1, 1867.
I claim the fumigating furnace, c, pan, d, pipe, e, and rack or cloth, b, when used together in combination, substantially as and for the purpose specified.

64,668.—CULTIVATOR.—A. T. Heflin, Monmouth, Ills.
I claim, First, Forming the shovels, I, with wings, the outer wing of each shovel being curved or turned up substantially as herein shown and described and for the purpose set forth,
Second, The combination of the pivoted bar, D, with the beam, G, and vertical bar, a', of the frame, A, substantially in the manner shown and described and for the purpose set forth.

64,669.—MANUFACTURE OF VINEGAR.—John Higbie, Rondout, N. Y.
I claim the improved process for the manufacture of vinegar from apples, substantially as shown and described.

64,670.—SEED PLANTERS.—George A. Hill and Conrad Lohnes, Springfield, Ohio, assignors to themselves and James M. Harner, Donnelsville, Ohio.
We claim, First, The combination of the double sided plough curving upwards from near the point to the heel and the shovels, O, adjustably attached thereto substantially as and for the purpose set forth.
Second, The combination of the wheel, D', adjustable pins, D', lever, E, and spring E', substantially as described.
Third, The combination of the lever, E, valves, F and F', and pins, F2, with the compound lever, G, having curved slots, G', in the outer ends substantially as set forth.
Fourth, The combination of the compound lever, G, valves, F and F', connecting bar, H, lever, J, hook, I', and driver's seat, K, substantially as described.
Fifth, The combination of the driver's seat, K, lever, P, cam, Q, and tongue, R, substantially as set forth.
Sixth, The combination of the tongue, R, attached to the rear of the frame and the brace, T, attached to the front thereof, and constructed and arranged to operate substantially as set forth.

64,671.—FLAME REGULATOR AND EXTINGUISHER FOR LAMPS.—William H. H. Hinds, Groton, Mass. Antedated May 1, 1867.
First, I claim the attaching of two pieces of metal made to close together around or above the flame to a cap to which cap is attached a collar or chimney holder when a chimney is used in such a manner that the said two pieces of metal shall form the vertex or top or a part of the vertex or top of said cap as herein described and as shown in figs. 1 and 2.
Second, The closing and opening of the said two pieces of metal by means of a collar or chimney holder as herein described and as shown in figs. 1 and 2.

64,672.—APPARATUS FOR PRODUCING GAS FROM PETROLEUM.—Heinrich Hirzel, Leipsic Saxony.
First. I claim the pumps V, and feed pipes Q, feeding the petroleum in a continuous jet to the retorts A, in combination with said retorts substantially as above set forth and described.
Second, The clockwork mechanism N, or its equivalent for working the pumps V, in combination with said pumps operating in the manner and for the purposes substantially as set forth and described.
Third, The wings R, regulating the clockwork mechanism N, in combination with said clockwork.
Fourth, The condenser E, combined with the connecting tube F, the latter setting into the hydraulic main C, where the bench consists of more than one retort or where one only is employed the condenser E, furnished at its bottom with an hydraulic main substantially as set forth and described.
Fifth, The hydraulic main C, in combination with the excess pipe or discharging tube, O, stand pipes, B, bell valves, D, and connecting tube, F, or their respective equivalents all substantially as set forth and described.
Sixth, The trapped tube I, in combination with the condenser E, and cistern G, substantially as described.

64,673.—PORTABLE WATER CLOSET OR ANOSMIA.—James G. Holmes, Charlestown, S. C.
First, I claim in a portable water closet constructed substantially as described, I claim the use of an exterior upright vessel and of an interior inverted vessel so arranged as to prevent the escape of any fetid odor by means of a water packing extending to the lower portion of the exterior vessel, substantially as described.
Second, As a new article of manufacture a portable water closet which is rendered inodrous by means of a closed inverted vessel with its water packing which extends to or below the bottom of the vessel which is to contain the fæces, substantially as and for the purpose described.
Third, In a portable water closet, I claim the rendering of the same, effective by means of an external vessel, an internal inverted vessel packed with water while the vessel to receive the fæces is separate and distinct from either of the others substantially as desdribed.

64,674.—EXPRESS MONEY ENVELOPE.—E. Hulbert, Atlanta, Ga.
First, I claim the improved express money envelope formed with additional flaps b1 b2, e1 e2, upon the side edges of the end flaps B, and B, substantially as herein shown and described and the purpose set forth.
Second, Forming holes through the side flaps D and E, in such positions that when the said flaps are folded and pasted down said holes may correspond with each other to allow the sealing material to come in contact with the end and side flaps at the same time substantially as herein shown and described.

64,675.—BEE HIVE.—Lafayette Kramer, Point Pleasant, Pa.
In a double bee-hive I claim the combination and arrangement of the case A, with the hinged lid B, and hinged door C, enclosing the shifting boxes 1 2, in pairs separated by the partitions a, and connected with the surplus honey boxes D D1 D2, substantially as and for the purposes herein described.

64,676.—WRENCH.—Wm. H. Landbeck, Rochester, N. Y.
I claim the oblong plate F, and spring E, the whole arrangement in the manner and for the purpose substantially as herein described.

64,677.—HOT AND COLD AIR BATHS.—Simon M. Landis, Philadelphia. Pa.
First, I claim the falling shutter a, with slide c, as set forth.
Second, Foot stool L, and seat stool 11, lined with tin or zinc, as set forth in combination with the bath room.
Third, Slides 2 and b, and double door E, and D, as set forth.
Fourth, Double inclined floors 6 6 and 7 7, as described and set forth.

64,678.—FRUIT DRYER.—Charles Leavitt, Cleveland, Ohio.
I claim the herein described arrangement of the channels or flues C C', and D, in combination with the pipes K and O, case A, for the purpose and in the manner set forth.

64,679.—HOP FRAME.—Joseph C. and Delos P. Leonard, Union City, Mich.
We claim our improved hop frame or trellises, constructed of inclined stakes or poles D D, supported by horizontal wires or chains A, stretched and secured as herein described all substantially in the manner and for the purpose herein set forth.

64,680.—STEAM GENERATOR.—Thomas C. Little, Dixon, Ill.
First, I claim the inner shell B, placed concentrically within the outer shell A having a flue J, between them for the passage of the products of combustion from the fire chamber G, the inner shell B, provided with a circular plate suspended from the rod N, against which the water from the injection pipe C, is thrown substantially as described for the purpose specified.
Second, The combination and arrangement of the shells A B, injecting pipe c, connecting pipe D, fire box G, and circular plate suspended from the rod N, substantially as described for the purpose specified.
Third, I claim the fire box constructed as described.
Fourth, I claim the arrangement of the arm a, the connecting rod c, and the crank b, by which the valve is operated in combination with pipes D and C, for the purposes set forth.

64,681.—PEAT MACHINE.—Charles Luxton, Hudson, N. J.
I claim the octagon roller, in combination with the lever for compressing peat, fuel or for making bricks.

64,682.—ALARM GUN.—T. E. Marable and Grey Utley, Petersburg, Va.
We claim the combination of the horizontal and radial barrels, when fired at the center by a single cap, and vertical hammer in the top of the box, arranged and operated as herein set forth.

64,683.—MOP HEAD.—H. H. Mason and Joseph Messenger, Springfield, Vt.
We claim the connecting of the movable jaw, D, to the nut, C, by means of the right and left screw threads on the ends of the jaws, D, fitting in right and left female or internal screw threads, m, ears or projections, c c, on the nut, C, substantially as shown and described.

64,684.—STREET-LAMP LIGHTER.—M. McGill and Joseph E. Tynan, Paterson, N. J.
We claim a hand lantern constructed as and for the purposes described.

64,685.—KETTLE.—Allen N. Merrill, Batavia, Ill.
I claim the eccentric hinge, E, the lip, F, the slide bolt, G, and the wood handle, H, in combination with the cover, B, the arms, C D, and the kettle, A, substantially as described.

64,686.—MACHINE FOR GRINDING SCALE PIVOTS.—Frederick Meyer, Newark, N. J.
I claim the construction and arrangement of the longitudinally sliding carriage, C, reciprocating carriage, D, and carriage, E, as herein set forth for the purpose specified.
Second, Adjusting the scale pivots to be ground on both sides by means of the set screws or pins, k l, secured to the arm, i, of the sliding carriage, E, and bar, H, upon the frame, A, substantially as herein set forth.

© 1867 SCIENTIFIC AMERICAN, INC

64,687.—KNIFE SHARPENER.—James Meyer, Jr., New York City.

I claim, First, The cutting plates, E E, provided with longitudinal rounded edges and connected together by a sliding joint, substantially in the manner as and for the purpose set forth.

Second, The combination of the handle, A, with the two pairs of cutters, E E F F, the clamp at one end of the handle and the recesses in the same to receive the cutters, with or without the strap, G, substantially as and for the purpose specified.

64,688.—FIBROUS PACKING FOR STEAM ENGINES.—Wm. H. Miller, Philadelphia, Pa.

I claim a packing consisting of a hemp, cotton, or other fibrous filling made into the form of a harl or roving and covered with a fibrous cover, substantially as described.

64,689.—CAR COUPLING.—Thos. S. Minniss, Meadville, Pa.

I claim a stop or hook that will hang on top of the drawhead and swing by its own gravity across the pin hole, which in combination with the pin when it is dislodged will make a complete counterbalance to the projecting end of the link to hold it horizontal, being a catch, trigger, and weight combined in a single piece, constructed and operated as and for the purpose set forth.

64,690.—THROTTLE VALVE.—Geo. Fred. Morse, Portland, Me.

I claim the arrangement of the partially balanced sliding throttle valve in its casing by means of its cylindrical form and by having the steam openings on one side and the channel, d, on the other side of the valve open to the admission and pressure of the steam to more than balance the area of the ports, so that the valve shall be pressed against the steam openings in the seat, but with so slight a pressure as to cause but little friction and require but little force to move it.

64,691.—MANUFACTURE OF SHOVELS.—H. M. Myers, Allegheny City, Pa.

I claim a blank for a shovel blade and handle straps when said blank is cast of steel, substantially as herein described and for the purpose set forth.

64,692.—PRUNING SHEARS.—John Neff, Jr., Pultney, N. Y.

I claim the lever, C, and spring, D, when made and arranged substantially as specified and used for the purpose set forth.

64,693.—BUCKLE.—Thos. L. Ogier, West Chester, Pa.

I claim the combination of the two parts, a f, pivoted to each other and furnished with the roughened surfaces, c i, for catching and clamping a leather or other flexible strap, substantially as and for the purpose described.

64,694.—FOLDING SEAT.—A. M. Olds, New York City. Antedated May 5, 1867.

First, I claim the combination of the legs, A A A, band, E, and rings, B B B, arranged substantially as and for the purposes set forth.

Second, The combination of the legs, A A A, plugs, L L L, and seat, M, substantially as and for the purposes described.

64,695.—SWEEPING MACHINE FOR RAILROADS.—E. A. F. Olmstead, New York City.

I claim the construction and arrangement of the levers, L M, of the same length, their inner ends slotted and pivoted together and to the stirrup, O, working vertically in the slotted snpport, P, and adjusted by means of the hand screw, Q, said levers near their outer ends pivoted to the supporter, N, upon the platform, A, and their outer ends pivoted to the rod, R S, attached to the ends of the shaft, K, respectively, whereby the said shaft and broom, G, are raised and lowered, substantially as herein set forth, for the purpose specified.

64,696.—COTTON-BALE TIE.—Wm. Onions, St. Louis, Me.

I claim the metal block, A, in combination with the wedge shaped metal piece, B, secured to the bale hoop end, C, arranged and operating substantially as and for the purpose set forth.

64,697.—MANURE DISTRIBUTOR.—H. S. Palmer, Norvell, Mich.

I claim, First, The cam pulley, H, the arm, I, and the hinged board or frame, G, when constructed and operating in the manner and for the purpose as herein specified.

Second, The cam pulley, H, in combination with the arm, I, when so constructed that the pulley can be moved nearer to or further from the fulcrum, whereby the discharge may be regulated by altering the stroke of the teeth, J.

Third, I claim the hooks, B B, the braces, D D, and the strap or chain, F, in combination, when arranged and constructed as herein specified.

64,698.—CLOTHES PIN.—Wm. Patterson (assignor to Geo. T. Comins), Lowell, Mass.

I claim the arrangement of the split teeth, C C, in combination with the body, B, constructed and operating in the manner herein represented and described.

64,699.—BEDSTEAD FASTENING.—Martin Pechmann (assignor to himself and J. F. C. Peckhardt), New York City.

I claim the combination of a cylindrical nut, B, with a screw, A, substantially in the manner as and for the purpose specified.

64,700.—WAGON BRAKE.—John W. Phillippi, Stahlstown, Pa.

First, I claim the boister, A, arranged and combined with the grooved friction roller, B, and axle, C, by means of bands, b' b' b b, substantially in the manner and for the purpose as herein set forth.

Second, The rods, F F, and rods, e e, as arranged for combining the brakes with the bolster and axle, substantially in the manner and for the purpose as herein set forth.

Third, The construction of an elongated slot, f, in the coupling pole, in combination with the bolster and friction roller, substantially in the manner described.

Fourth, The check or stop as arranged and combined with the coupling pole, substantially in the manner and for the purpose as herein set forth.

64,701.—BREECH-LOADING FIRE-ARM.—Thos. Poultney, Baltimore, Md., and Silas Crispin, New York City, assignors to Thomas Poultney.

We claim the horizontal reinforce lip or projection described, on the breech piece receptacle of breech-loading fire-arms of the class specified, said reinforce being formed and located substantially in the manner and for the purpose set forth, and having to serve in combination with it a guiding stud, z, or its equivalent in effect, also as explained, for the purpose explained.

64,702.—COMPOSITION FOR PENCILS.—S. C. Pruden, Athens, Ohio.

I claim an indelible pencil formed of the ingredients hereinabove named, mixed in or about the proportions substantially as described.

64,703.—APPARATUS FOR IMPREGNATING WOOD WITH TAR AND OTHER MATERIALS.—George Pustkuchen, Hoboken, N. J.

First, I claim an apparatus for impregnating wood, that is made and operated substantially as herein shown and described.

Second, The application of an air pump for the purpose of impregnating wood, when combined with the cylinder, C, and boiler, B, substantially as and for the purpose herein shown and described.

64,704.—DOOR HOLDER.—William Quayle, Warsaw, Ill.

I claim holding a door in any desired position by raising and lowering the rod, C, and its attachments, substantially as herein shown and described.

64,705.—CAN FOR HOLDING WHITE LEAD AND OTHER MATERIALS.—Alexander Randol, Allegheny City, Pa.

I claim the groove, D, in flange, C, of the lid, A, when used in combination with the bead, f, of the body, B, of the can or vessel, said flange, groove and bead being constructed, arranged and operating in the manner and for the purpose herein described.

64,706.—PLANING MACHINE.—Lemuel Read, North Brookfield, N. Y.

I claim in a rotary planing machine moving the cutters over the material operator on instead of the said material under the cutters, by means by the crank, F, pinion, I, and rack, L, pinion, K, and sliding frame, C' constructed and operating in combination, substantially as described.

64,707.—PLOW.—Jacob Reedy, Toledo. Iowa.

First, I claim the guard, C, adjustably attached to the beam or standard of a shovel plow, so as to operate substantially in the manner and for the purpose set forth.

Second, The pulverizer, F, adjustably attached to the standards or beam so as to operate in rear of the shovels of a plow, substantially in the manner and for the purpose set forth.

64,708.—POTATO DIGGER.—Elijah Rexford, Mentor, Ohio.

First, I claim the mode of supporting the fork as described so that it can be operated in the peculiar manner set forth, by means of the guide, C C, notched head, E, spring catches, G G', perforated rail, D, ratchet and pawls, J L, and handle, M, or by means equivalent thereto as and for the purposes stated.

Second, Supporting the guides, C C, and perforated rail, D, which carries the said fork, on the axle tree, A, and wheels, B B, whereby I am enabled to use said axletree as a fulcrum for raising the said fork with its contents as set forth.

64,709.—SMELTING FURNACE.—James A. Root, East Canaan, Conn., and J. M. Bartram, Sharon, Conn.

First, We claim the constructing of the hearth of a smelting furnace of cut stone having their inner surfaces rounded so as to form an interior of inverted conical shape with a solid or single stone, a, extending across the passage, i, substantially in the manner as and for the purpose set frrth.

Second, Having the lower parts of the blast pipes, B, formed of sections, c, arranged to slide one within the other, substantially as and for the purpose specified.

Third, The glasses, f, in the pipes, B, in combination with the openings, d, substantially as and for the purpose set forth.

64,710.—LOCKING APPARATUS FOR FERRY BOATS.—J. Rowland, Brooklyn, E. D. N. Y.

I claim the hooks, f f, arranged on the underside of the bridge, B, and weighted at their inner ends, substantially as and for the purpose herein shown and described.

Second, The bars, a, arranged at each end of the boot, below the deck and operated by the shaft, b, and chains, e, substantially as and for the purpose herein shown and described.

64,711.—CARRIAGE CLIP.—George B. Salmon, St. Paul, Minn.

I claim the combination of the thill iron, E, clip, B and rubber plate, G, and bolt, b3, the whole constructed and operating substantially as described and for the purposes set forth.

64,712.—STEAM GOVERNOR.—R. Sanderson, Cleveland, Ohio.

First, I claim the arrangement of the valve seat, E, and valves, G, when operating conjointly in the manner, substantially as described.

Second, The springs, J, as arranged in combination with the lever, I', rock shaft, H, and steam valve or valves for the purpose and in the manner as set forth.

Third, The screw, P, as arranged in combination with the lever, I' shaft, H, and valves, G, as and for the purpose substantially as set forth.

64,713.—TURN TABLE FOR BRIDGES.—Coleman Sellers (assignor to William Sellers & Co., Philadelphia), Pa.

I claim the combination of the central cylinder, M, radial bolts, K and L, and the cylindrical curb, H, or its equivalent, substantially as described for the purpose specified.

64,714.—MODE OF MAKING DRAINING TILE.—Benjamin A. Shaffer, Cass county, Ind.

I claim the lever or roller, as substantially described above for making and forming underground draining tile, the said lever or rolling working in a sliding mold or in any other manner, substantially the same.

64,715.—ATTACHING THILLS TO VEHICLES.—N. H. Shaw, Holderness, N. H.

First, I claim suspending the shaft to its coupling on carriage axle, between two bearings or ear pieces thereof susceptible of adjustment, substantially as described.

Second, A shaft coupling having that part of the same attached to the axle made in two parts or sections secured and hung together at one end and one upon the other with the shaft strap or bar suspended by a center bolt between ear pieces at their other ends, substantially as and for the purpose described.

Third, The conical shaped bearings between the shaft strap or bar and the part of the coupling secured to the axle, substantially as described.

64,716.—STEAM WHISTLE.—Thomas Shaw, Philadelphia, Pa.

I claim the combination of tubes, a and g, as set forth in combination with the apertures, f, for the purpose specified.

64,717.—SWEAT LEATHER FOR HATS.—David Shive, Philadelphia, Pa. Antedated May 9, 1867.

I claim the application to a hat of the supplementary sweat leather, B, constructed and operating substantially as and for the purpose described.

64,718.—BILLIARD REGISTER.—G. Simpson and R. M. Taylor, Waterbury, Vt.

I claim the arrangement of the two external dials with movable hands, A A' to indicate the points tallied by each flagen and the bell to give notice when the game is up in combination with the internal notched disk, D, spring finger and pawl, c, used a series of ratchet wheels, H I J, having numbers to register and indicate the games played, the same being operated in keeping the tally substantially in the manner herein described for the purpose specified.

64,719.—CHANDELIER.—Russell J. Skinner (assignor to Mancel Talcottt), Chicago, Ill.

First, I claim the combination and arrangement of the rod, L, tube, J, reservoir, A, tubes, B, and wick cups, C, operating substantially as and for the purposes specified.

Second, I claim the arrangement of the spring catch, b, or its equivalent, with the tube, J, and rod, L, when provided with one or more grooves, c, substantially as and for the purposes set forth.

Third, I claim the combination of the sleeve, G, arms, F, and globe rests, E, with the case, I, arranged and operating substantially as specified and shown.

Fourth, I claim the combination of the spool, N, movable section, O, and elastic band, R, substantially as and for the purposes specified.

Fifth, I claim the arrangement of the cap, a, with the reservoir, A, and tube I, or its equivalent, operating as and for the purposes specified and shown,

64,720.—SAFETY-VALVE DEVICE.—William H. Stanton, Dunmore, Pa.

First, I claim the combination of the piston, B, in the cylinder steam channel, C D, opening into the cylinder at a, above the piston, and at b c, below the piston, piston, J, spring, K, and set screw, m, substantially as described for the purpose specified.

I claim the plunger, J, the spring, K, the channels, C D, the apertures, a b c, and the set screw, m, arranged and operating substantially as described in combination with the cylinder and the piston, for the purposes set forth.

64,721.—CULTIVATOR.—G. W. Stockton, Oquaka, Ill.

I claim the swivel rods, G, in combination with the joint or pivoted clevises, c, the draft-evening device, K, and bent bars, L, arranged and operating substantially as described for the purpose specified.

64,722.—APPARATUS FOR WELDING CHAIN LINKS.—Edward Tangye, Brussels, Belgium. Antedated April 26, 1867.

I claim the improvements in tools for welding the links of welded iron chain and welded steel chain, hereinbefore described and illustrated in Figs. 1, 2, 3 and 4, of the accompanying drawings,

64,723.—COMBINED SEEDER AND CULTIVATOR.—Frederick W. Tilton, Bristol Station, Ill.

First, I claim the connected frames, B and C, carrying the teeth, I, and roller, D, in combination with the beam, N, and its connections for adjusting the depth to which the teeth may operate, all substantially as as and for the purpose herein set forth.

Second, I claim, in combination with the roller, D, and framing, B, the gearing, D' E, and universal joint, e, provided with the lever, J, and spring, K, for bringing the gearing into action with a yielding force and allowing it to be thrown out of and into gear, substantially as and for the purpose herein specified.

Third, I claim, in combination with the roller parts, D C, the cultivator parts, B I, and the drilling mechanism, G M A, with their several connections, adapted to operate conjointly substantially, in the manner and for the purpose herein set forth.

64,724.—STEP FOR UPRIGHT SHAFTS.—Charles R. Tompkins, Rochester, N. Y.

I claim the inside sleeve, b, with its projections and the oil chamber, d d, in combination with steel screw, g, substantially as described.

64,725.—COOKING RANGE.—John Van, Cincinnati, Ohio.

I claim the arrangement of broiler or fire chamber, B, having both descending and ascending valve-guarded communications, O P, with the flues, K L M, of one or more elevated ovens, J J', at the discretion of the operator.

64,726.—BRICK MACHINE.—Thomas Walsh, John Walsh and David Evans, Brownsville, Pa.

First, We claim the slotted and grooved plunger, I, working in the chamber, J, provided with the partitions, o, in combination with the plungers, b, and the slide, N, provided with the molds, h, all arranged substantially in the manner as and for the purpose set forth.

Third, The slides, M, working through the hoppers, K K, and in openings, d, in the sides of the chamber, J, in combination with the rotary shafts, L, provided with the pins, c, substantially as and for the purpose specified.

Third, The combination and arrangement of the reciprocating slide, N, provided with the openings or molds, h, the plungers, I I, chamber, J, slides, M, and hoppers, K K, provided with the rotary shafts, L, having pins, c, attached, all arranged substantially as and for the purpose set forth.

64,727.—SEAT FRAME FOR CHAIRS.—G. A. Watkins, Proctorville, Vt.

I claim securing the legs to the seat of the chair by means of the metallic corner pieces, I, provided with the perforated extension plate, K, bent at right angles thereto and forming nuts to receive a bolt passing through the leg of the chair, substantially as herein shown and described.

64,728.—ADJUSTING SCREW FOR THE LEGS OF FANNING MILLS.—Herman Wolf, Avon, Pa.

I claim the construction and arrangement upon the legs of a fan mill or other machine of the bars, D, with their ends bent at right angles and perforated to receive the adjustable pointed screw, E, provided with the handle, F, as herein set forth for the purpose specified.

64,729.—HAY UNLOADER.—Julius Wood, Smyrna, N. Y.

I claim the combination of the hooks, ropes, and head piece, or their mechanical equivalent, as and for the purposes herein set forth.

64,730.—WATER INDICATOR FOR BOILERS.—Isaac F. Woodward, Philadelphia, Pa.

I claim a glass tube having a closed top and lower open end communicating with the steam space of a boiler in combination with an indicating rod arranged to slide in the tube and connected to or controlled by a float, all substantially as and for the purpose herein set forth.

64,731.—PAINT BRUSH.—John N. Woodward (assignor to himself and Thomas Arenser), Aurora, Ill.

I claim the band, A, with eyes, tongues and slots, as described, for attachment adjustably to the outside of paint brushes, substantially in the manner set forth.

64,732.—SHAVING BRUSH.—W. T. Wylie, New Castle, Pa.

I claim the arrangement of the case, C, piston, E, screw, I, nut, E, and cap, G, as and for the purpose described.

64,733.—CLAW FOR DRAWING NAILS.—J. S. Allen and O. Gillmor, Norwich, Conn.

We claim the combination of the pivoted fulcrum piece, C, with the gripping jaws formed upon the two levers, A B, substantially as herein set forth for the purpose specified.

64,734.—EYELETTING MACHINE.—N. Ames, Saugus Centre, Mass. and J. E. Gowen, Stoneham, Mass., assignors to A. B. Ely (by separate deeds), Newton, Mass.

First, We claim the combination of a vertically reciprocating puncher and header, each acting independently of the other, with a heading seat confined to and reciprocating in the same vertical plane, all arranged and operating so as to act at the same fixed points, substantially as described.

Second, Supplying the eyelets from a common hopper to the heading seat or holding point by means of the endless belt and groove, substantially as described.

Third, The combination of a horizontally reciprocating supporting table with a vertically reciprocating puncher, header, and heading seat, all arranged and operated in relation to the same fixed point, substantially as described.

Fourth, The work feeding device, constructed and arranged with an eyeletting machine substantially as described.

Fifth, The adjustable gage, in combination with the reciprocating table for regulating the setting lines of eyelets, substantially as described.

Sixth, Punching the holes by the vertically reciprocating movement of the puncher in connection with the punching table, furnishing the eyelets, and inserting and heading the same by the vertically reciprocating action of the heading seat, at the same fixed point, automatically, substantially as described.

Seventh, The reciprocating punching table and heading seat, so combined, arranged, and operated as to alternately occupy the same place for punching the holes and heading the eyelets at the same fixed point, substantially as herein described.

64,735.—PUMP.—Calvin Baker, Weymouth, Mass.

I claim the combination as well as the arrangement of the chamber, H, the pump barrel, A, the induction conduit, G, the valve, E, and the box, B, the whole being made to operate substantially as described.

64,736.—SHOE BRUSH.—C. L. W. Baker and L. S. Hills, Hartford, Ct., assignors to Lester S. Hills and George D. Jewett.

We claim the stopper, k, with the tube or tubes, h, brushes, e e', and receptacle, c, substantially as and for the purpose described.

64,737.—ROLLING MILL.—Royal M. Bassett (assignor to himself and Theo. S. Bassett), Derby, Ct.

I claim the employment, in combination with the box, of the lower roll of the adjusting wedge, L, inclined seat, K, screw shaft, P, and hand wheel, S, or its equivalent, the whole to operate as specified for the purpose set forth.

64,738.—MODE OF LIGHTING GAS.—W. W. Batchelder, New York City.

First, I claim the mode or process, herein described, of rendering a cord or tape combustible and inflammable by friction, substantially as set forth.

Second, The cord or tape coated with the ingredients, and in the manner herein specified.

Third, The application to and combination with a gas burner of otherwise ordinary or suitable construction, of a device composed of the following elements, viz:—

1st. A receptacle for the fuse or igniting cord.

2d. A tube through which the fuse is conveyed from the receptacle to within igniting distance of the gas issuing from the burner.

3d. A friction device to ignite the fuse at the end of the tube.

4th. A feeding mechanism to supply the fuse to be burned.

Fourth, The fuse receptacle made annular so that it may be mounted upon the burner, substantially as set forth.

Fifth, The combination with the receptacle and tube containing and conveying the fuse, as described, of a friction device operated by a rotary spindle, substantially in the manner and for the purposes set forth.

Sixth, The combination with a rotary spindle, carrying the friction device of an endless screw and feed rack, under the arrangement described, so that by rotating the spindle the said rack shall be revolved and effect the feed of the fuse, substantially as herein shown and specified.

Seventh, In combination with the fuse receptacle and the feed and friction device, I claim the device herein shown and described, or the equivalent thereof, for checking the retraction or backward movement of the fuse.

64,739.—METHOD OF HANGING CENTER BOARDS OF VESSELS.—William W. Bates, Chicago, Ill.

I claim suspending the center boards of vessels by means of the frame, B, in combination with the plates, D, constructed and arranged substantially as described.

64,740.—WINDOW-BLIND FASTENER.—Charles P. Bell, Nashua, N. H.

I claim the stem B, provided with a thumb piece upon its side and a catch upon its lower end when used in combination with the socket or tube, A, provided with an opening or slot in its side to receive the thumb piece, and with a coiled spring, C, which surrounds the stem as and for the purpose herein specified.

64,741.—MELODEON.—Jonas Berger, Knoxville, Tenn.

I claim, in the construction of an upright melodeon, arranging four swells and springs with the double reed boxes and bellows, and combining therewith the double series of levers, as arranged for operating the swells, substantially in the manner and for the purpose as herein set forth.

64,742.—BUTTONS.—A. W. Browne, Brooklyn, N. Y.

I claim the fastening device consisting of the retainer, B, the ends of its stem or shank being provided with hooks, S, projecting inwardly or toward each other, in combination with the plate or button head, A, which is provided with the bridge or eye, I, substantially as described.

64,743.—CORNSTALK CUTTER.—Samuel Bryan, Jefferson, Wis.

First, I claim the frame consisting of the bars, A and U, mounted on the wheels, B, with the curved axle, O, and knives, K, arranged as shown and described.

Second, The swinging frame, G, arranged to receive and hold the cut stalks, as set forth.

Third, In combination with the swinging frame, G, I claim the windlass, Y, with its cord, a, arranged substantially as set forth, for compressing the bundles for binding.

64,744.—HARVESTER.—Charles W. Cardot, Fredonia, N. Y.

I claim in a two wheeled machine, a compound gear frame and shoe composed of the parts c c1 c2 and c3 c4 c5 and hinged to the axle of the driving wheels the whole being constructed, arranged and operated in the manner substantially as set forth.

64,745.—ATTACHING THE DRAFT POLE TO MOWING MACHINES.—Charles W. Cardot, Fredonia, N. Y.

I claim in a two wheeled machine having a gear frame shoe constructed as herein described and journalled to the axle of the driving wheels, the attachment of the draft pole to such frame at a point or points between the axle and shoe for the purpose and substantially as described.

64,746.—DRAFT POLE FOR MOWING MACHINES.—Charles W. Cardot, Fredonia, N. Y.

I claim a draft pole having a removable push back iron or sleeve C, in combination with the sliding rod B, pulley D, and chain b', constructed, arranged and operating substantially as herein described.

64,747.—PLOW.—Andrew Carson, Memphis, Tenn.

First, The herein described construction of the shovel A, with the steel laid on the front side and its turned up edges B, in combination with its center C.

Second, The diagonal band D, constructed as described and shown.

Third, The center C, with its notches.

Fourth, I claim the braces E and F, in their relation to the beam H, and standard I, all arranged as and for the purposes specified.

64,748.—FIELD ROLLER.—C. B. Colcord, Greenville, Ill.

First, I claim the combination and arrangement of the frame A, with the oscillating frames B' B', substantially as described and set forth.

Second, I claim the adjustable device C, c, C2, for the purpose of changing the ballast box forward or backward, substantially as described.

64,749.—FRUIT GATHERER.—J. C. Counts, Cross Roads, Ohio.

I claim an apparatus for gathering fruit constructed with the parts A B C D and E, respectively, constructed and arranged substantially as set forth.

64,750.—BALANCE VALVES FOR STEAM ENGINES.—Jacob G. Crockett, Portsmouth, N. H., assignor to himself, John J. Flanders and John W. Hayes.

First, I claim the arrangement of two valves on the same shaft, so that the shaft shall hold the valves against the pressure of the steam, and relieve the valve seats from the pressure of the valves, substantially, as herein set forth,

Second, I claim the devices described for traversing one of the valves on the shaft to adjust both to their seats, substantially as described.

64,751.—METHOD OF REPAIRING RAILROAD RAILS.—John B. Deck, Martinsburg, West Virginia.

I claim the anvil A, with its recesses and grooves combined with the dies B B', lifters C C', and levers D D', arranged and operating substantially as and for the purpose set forth, and this I claim whether the anvil be furnished with one or more pairs of dies with lifters and levers as described.

64,752.—MEASURE AND FUNNEL COMBINED.—Henry L. Dickenson, East Berlin, Conn.

I claim the combination of the measure A, and nozzle C, with the valve G, sleeve C', and spring E, substantially as and for the purpose described.

64,753.—ENVELOPE.—Henry Everdell, New York City.

I claim the envelope constructed substantially as described with a flap and tongue, the latter fitting through an incision in a closed wing or portion of the back, and the tongue or flap and wing into which it fits being embossed and provided with a bow or knot to give a secured aspect to the envelope while it is left free to open yet protected against flaring open substantially as specified.

64,754.—MACHINE FOR MAKING WAGON CLIPS.—George Feightner, Wooster, Ohio.

I claim the stationary die G, and movable dies C F, in combination with the die box B, constructed as and for the purpose set forth.

64,755.—COMBINED HOE AND HAND PLANTER.—Henry Feesler and Isaac E. Betz, Canton, Ohio.

We claim the cylinder E, as constructed and used in combination with the plug C, with its set screw and seed recess, and handle D and A, as and for the purpose specified.

64,756.—STEAM HEATING AND VENTILATING APPARATUS.—Ferdinand Fisher, Cambridge, Mass.

I claim the apparatus above described, for utilizing exhaust steam for the purpose of heating, and for ventilating apartments or buildings, consisting of the tubular drum A, with its induction and eduction pipes d e, and the blower or blast apparatus B, combined and operating as set forth and explained.

64,757.—KNUCKLE JOINT.—George B. Garlinghouse, North Madison, Ind.

I claim a knuckle joint provided with cylindrical terminations adapted to roll upon each other, and held in place by racks and links, or their equivalents, substantially as set forth.

64,758.—CHURN.—David Gates, Captina, P. O., Ohio.

I claim the combination of the radial dashers G, with centre tube M, be

© 1867 SCIENTIFIC AMERICAN, INC

tween the posts P P P, and cross braces J and L, when constructed, arranged and operated as herein described and for the purposes set forth.

64,759.—FEED RACK.—E. Gratten, Williamstown, Mich.

First, The combination of troughs O and H, constructed and operating in the manner and for the purpose herein set forth.

Second, The receptacle F, constructed as and for the purpose described.

Third, The troughs O and H, in combination with the adjustable sides C, and rack bars n, and the periorated bottom F, the whole constructed, arranged and operating as and for the purpose herein specified.

64,760.—Suspended.

64,761.—EYELETTING MACHINE.—Luther Hall (assignor to Alfred B. Ely), Boston, Mass.

I claim, First, The latterally-sliding head or carrier, in combination with the punch and set, constructed, arranged, and operating in the manner and for the purpose substantially as described.

Second, The head or carrier so constructed and operated as to allow the punch and set to be alternately depressed by the same lever, substantially as described.

Third, So constructing the mechanism that the punching table and setling bed shall reciprocate laterally, alternately occupy the same place, the holes be punched, and the eyelets set at the same time, in the manner substantially as described.

Fonrth, Feeding the material forward after the eyelet is set and away from the setting point, by means of the solid pointed setting bed, under an arrangement and combination of parts, substantially as described.

Fifth, The constantly-pressing spring-presser foot, in combination with the feeding mechanism as described, stripping the material as it is eyeleted from the constant grasp of the table and the foot, under an arrangement of parts as set forth.

Sixth, The hopper for holding the eyelets, in combination with agitating devices as described, and the adjustable chute provided with the enlarged receptacle or disk at its lower end, constructed and arranged as and for the purpose set forth.

Seventh, The setting die, so constructed and operating as to pick up the eyelets from the enlarged receptacle in the chute by adhesion, and present them to the place of insertion, substantially as described.

Eighth, The combination of the levers, V and F, and pin, S, operating in the manner and for the purposes set forth.

Ninth, The striking lever, so constructed and arranged as to cause the set to be forced into the eye of the chute and pick up the eyelet while the punch is making the hole for its reception, substantially as described.

Tenth, The combination of plates, Q and R, arranged and operated as described.

Eleventh, Punching the holes, supplying, inserting, and setting the eylets, adjustably spacing the distances, and feeding forward the work by means of devices, so combined as to effect these objects automatically, when constructed, arranged, and operated in the manner described.

64,762.—ANCHOR STOCK.—John Luke Hanly, San Francisco, Cal.

I claim an anchor stock, C, in combination with the permanent flange, C, and removable key, D, substantially as and for the purpose herein set forth.

64,763.—MANUFACTURE OF THE CARBONATE OF LEAD.—Henry Hannen (assignor to S. A. Hannen and S. W. Greene), Philadelphia, Pa.

I claim, First, The manufacture of carbonate of lead by the action upon metallic lead or oxide of lead of water, acetic acid, and carbonic acid gas, when the said fluids are brought in contact with the lead, substantially as described.

Second, Subjecting the lead to the action of carbonic acid gas under a pressure, substantially as and for the purpose set forth.

Third, Subjecting the lead, during the process of its conversion into a carbonate, to the action of chlorine, for the purpose specified.

64,764.—RAILROAD SWITCH.—Andrew Hartman, Canton, Ohio. Antedated May 5, 1867.

I claim in an automatic switch the arrangement of the plate, b, with tumbler, g, weight, m, trigger, n, and spring, s, operated by the shoe, q, and eccentric, C, connected to the railroad car and rail respectively, when used in combination with the plate, E, levers, D D', connected by the rods, d, and operating in the manner substantially in the manner substantially as specified.

64,765.—HINGED GUN-REST.—Joseph Hawkins, West Windsor, N. J.

I claim the slide, F, and jointed rod, G, in combination with the plate, D, beneath the barrel, B, of a fire-arm, the whole being constructed and arranged as described.

64,766.—SUSPENSORY BANDAGE.—Edward Heaton (assignor to C. B. Whittlesey), New Haven, Conn.

I claim the combination of the pouch, A, having the opening, C, protected in the manner described, with the body piece curved, formed, and attached thereto, as shown and described, and the straps, D and E, also curved, formed and attached to the said body piece, as set forth, the whole constructed and arranged in the manner herein specified.

64,767.—MODE OF SECURING WOOD TO METAL.—Robert Howdon (assignor to Crane, Breed & Co.), Cincinnati, Ohio.

I claim securing wooden or like objects to metallic surfaces, etc., by casting Babbitt or other metal of easy fusion into flaring or branching holes, C D, and otherwise, as herein shown and described.

64,768.—LAMP.—John S. Hull, Cincinnati, Ohio.

I claim the cap, B, as applied to the condensing pump, A, and in combination therewith, for the purpose herein specified.

I also claim the extension of the valve rod through the lamp reservoir. and the arrangement of the valve-adjusting device connected therewith in the base of the lamp, as herein set forth.

64,769.—GENERATOR FOR VAPOR LAMPS.—John S. Hull, Cincinnati, Ohio.

First, I claim the chamber, B, of a gas generator, when constructed with lips, I I', projecting above the point of ignition, and in immediate contact with the flame, the oil being conducted through them in tubes, C and C', substantially as set forth.

Second, In combination with the opening, M, through the chamber, B, connecting with the internal chambers, G, I claim the adjustable collar, K, for regulating the supply of atmospheric air, substantially as and for the purpose set forth.

Third, I claim the chamber, B, when constructed with pipes, C C', lips, I I', and openings, B2 and M, arranged substantially as and for the purpose set forth.

Fourth, I claim the receiving chamber, D, formed in the boss, L, with its induction and eduction openings, when the flow of gas through the same is regulated by a valve, E, substantially as set forth.

64,770.—MOTIVE POWER.—Andrew Johnson and W. H. Elliot, Bloomington, Ind.

I claim the motive power, which is constructed and operated substantially as herein described.

64,771.—HAND PLOW.—F. Keefer, Greenfield, Ind.

I claim, First, The arrangement of the beams, A, the wheel, B, roller, G, and shank, H, provided with the brace, J, and point, I, as and for the purpose set forth.

Second, The hinged brace, E, in combination with the standard, C, and beams, A, as and for the purpose specified.

64,772.—DEVICE FOR CLEANING STABLES.—Solomon Kepner, Pottstown, Pa.

I claim the fork, A, and hooks, B B, and combination of fork and hooks, for the purpose herein set forth.

64,773.—BEEHIVE.—K. P. Kidder, Burlington, Vt.

I claim, First, The arrangement of the frames having bars constructed as described, with the support slotted as described, and with the bottom strips, e e, substantially as herein set forth.

Second, The box or trap, G, in combination with the tube or passage, H, and body, A, whereby the drones are allowed to pass out, but not to return to the hive, and are caught and separated from the worker bee, so that they may be destroyed, substantially as set forth.

64,774.—LIGHTNING CONDUCTOR.—J. A. Kissell and N. Blickensdufer, Chicago, Ill.

We claim a lightning conductor, consisting of a strip of copper, having the ribs, a, formed solid therewith, as herein shown and described.

64,775.—STEAM-ENGINE GOVERNOR.—J. P. Theodore Lang, Washington, D. C.

I claim, First, The combination and arrangement of the curved slotted guides, H H, collar, h, arms, d, friction rollers, d', springs, f f, weights, E E, collar, F, friction rollers, g g, loose collar, d, rods, i, collar, k, constructed, arranged, and operating in the manner substantially as shown and described and for the purpose set forth.

Second, The combination of the valve, M, and cover, L, with the governor, substantially as set forth.

64,776.—APPARATUS FOR CARBURETING GAS.—W. H. Lauback, Philadelphia, Pa.

First, I claim the carbureting vessel, B, in combination of the regulator, A, substantially as described.

Second, I claim the combination of regulator, A, and hydrocarbon vessel, B, substantially as described.

64,777.—APPARATUS FOR MAKING PEAT CHARCOAL.—James B. Lyons, Litchfield, Conn.

First, I claim a revolving cylinder, constructed and arranged as herein described, for making charcoal or coke directly from the crude or bog peat, substantially as herein set forth.

Second, I claim constructing a furnace with cast-iron ends and a fire box, in and over which is a revolving cylinder made of boiler iron, fitted and supported on friction rollers, to enable it to be easily turned to change the position of the material.

Third, I claim the pipe, h, as arranged for conducting the gas from the cylinder, A, into the fire box, C, to supply feed for operating substantially as and for the purposes specified.

Fourth, I claim the flanged heads, a a, with semicircular openings, b, and sliding covers, c, in combination with revolving cylinder, R, friction rollers, e e, and fire box, C, as constructed for converting crude peat into charcoal and coke, substantially as described.

Fifth, I claim the gas pipe, h", the bulk or vessel, m, stop cock, n, in combination with the furnace, C, and cylinder, A, all arranged and operating substantially in the manner as and for the purposes herein set forth.

Sixth, I claim the mode of constructing the double arches supporting the brick on ribbed curved bars so as to leave a longitudinal flue the whole length of the furnace, for saving the heat from the flame generated from the gas in the cylinder, as set forth.

64,778.—BRICK MACHINE.—John Marshall, Fond du Lac, Wis.

First, I claim in combination with the mold the wedge-shaped cover working in corresponding wedge-shaped grooves, in order to bind the cover home to the mold during the pressing, then to facilitate the removal of the cover, substantially as set forth.

Second, In combination with the lever, b, and the follower, I claim the swinging fulcrum, L, for preventing the side strain and consequent binding of the follower, substantially as described.

Third, The follower, D, working in the mold, in combination with the sliding cover, S, and operated by the knuckle-joint lever, F G, operated substantially as shown and described.

Fourth, The lever, R, provided with the hook, F, for releasing the cover, S, substantially as set forth.

64,779.—MACHINE FOR MAKING DOOR AND WINDOW FRAMES.—W. W. Maughlin, Baltimore, Md.

First, I claim the saw table, B, provided with the adjustable gage as described, in combination with the circular saw, b, and one or more grooving cutters, constructed, arranged, and operating substantially as and for the purpose set forth.

Second, The miter stand or table provided with the adjustable gage, F, in combination with the vertically adjustable miter saw, b', arranged and operating as set forth.

64,780.—BOOTS AND SHOES.—Edward Mayer, Philadelphia, Pa.

I claim extending the side and front edges of the insole of a boot or shoe upward around the inner side of the upper, substantially as and for the purpose described.

I also claim the application of the band, F, over the joint formed between and by the upper and the outside sole of a boot or shoe, substantially as and for the purpose described.

64,781.—LOW WATER INDICATOR.—Geo. McAllister (assignor to himself and Chas. B. White), San Francisco, Cal.

I claim a water gage composed of the float, f, arm, d, parts or case, A B and C, and passages, D D, constructed substantially as and for the purpose described.

64,782.—MAKING BUCKLES.—G. B. McDonald, New Albany, Ind., assignor to J. Bragdon & Co.

I claim making buckles by first rolling the metal bar to the shape represented in fig. 2, and afterward dividing and punching the same, all as described.

64,783.—METAL BEAM.—Joshua Merrill, Boston, Mass.

I claim the hollow metal beam made water tight and suitable to contain a body of water within it and provided with suitable apertures for the introduction of water, substantially as hereinbefore described and substantially for the purpose hereinbefore set forth.

Also in combination with said hollow metal beam constructed with suitable apertures for the introduction of water and the escape of steam, a body of water contained within said beam, substantially as described for the purposes set forth.

64,784.—PEAT GATHERING MACHINE.—Abraham Michelbacher, New York City.

First, I claim the combination of the scraper, F, the rotating buckets, E, and the receptacle, C, with a suitable carriage, substantially as and for the purpose specified.

Second, The scraper, F, pivoted in rear of the rotating buckets, E, and furnished with handles, n, whereby the said scraper may be made to operate at a greater or less depth, substantially as herein set forth.

Third, The receptacle, C, suspended on pivots in front of the rotating buckets, E, and constructed with an end board, F, hinged at its upper edge, substantially as and for the purpose specified.

64,785.—HOISTING MACHINE.—Wm. Miller, Cincinnati, Ohio.

First, I claim the combination of rod, H, levers, P P, and pawls, N N, jointed substantially as described, with the racks, O O, and a spring, L, substantially as and for the purpose set forth.

Second, The catches, S S, and spring, X X, or their equivalents, for the purpose of affording an automatic stop for the platform (to which they are not attached when the safety apparatus fails to act), as described.

64,786.—BREECH-LOADING FIRE-ARM.—W. H. & G. W. Miller, West Meriden, Conn.

First, I claim the construction of the breech piece with the central elongated slot. combined with the cross head and mortise in the case, for the purposes and operating in the manner described.

Second, The combination of the breech piece cylinder pinion, D, and cylinder, E, toothed and geared together and operating in the manner and for the purposes described, by means of the lever or arm, F.

Third, The combination of the elongated slot with the mortise or recess in the shell of the case, whereby the exact amount of upward and downward movement of the breech piece is regulated by the length of the slot, so that the cross head is brought home in the mortise or lifted out at the instant required.

64,787.—MEDICAL COMPOUND.—C. H. Mitchell, Bristow Station, Ky.

I claim the compound made of the aforesaid remedies for curing disease as specified.

64,788.—CARPET STRETCHER.—Geo. Mosman, Chicopee, Mass.

I claim the spring-holding jaws, d d, formed in one piece of metal, in combination with the plate, k, substantially as and for the purpose described.

64,789.—CORN HARVESTER.—Josiah Oadhoudt, St. Anthony's Falls, Minn.

I claim the frame, A, with its oblique guides, G G, reel, F*, constructed as set forth, cutters, E E, attached to the bars, D D, each side of the thills, C C, and the pivoted arms, g g g, for dropping the corn, when constructed, arranged and operating in the manner substantially as and for the purpose herein specified.

64,790.—BENCH PLANE.—Nelson Palmer (assignor to himself Sidney W. Palmer, and J. Foreman Palmer), Auburn, N. Y.

First, I claim the combination with the movable section or plate for adjusting the size of the throat of a recessed bed and frame formed in the plane stock in front of the bit and parallel to the face of the plane so as to enclose the said section on three sides and form the ways in which it slides for purposes of adjustment, substantially as shown and set forth.

Second, The bed for supporting the heel of the bit formed of lead or other suitable plastic material as specified, run between the said heel and the back of the throat so as to form an accurately fitting and solid bed for bit close to its cutting edge, substantially as herein set forth.

Third, The method of and means herein described for adjusting the bit longitudinally so that it shall project more or less from the face of the plane that is to say connecting the bit with an eccentric mounted in the bed of the bit the eccentric being operated suostantially as herein shown and set forth.

Fourth, I claim the mechanism for maintaining the parallelism of the edge of the bit with the face of the plane, the same consisting of the combination with the bit and bed in which it is supported of a bar capable of sliding laterally in the bed as described, and connected with the bit under such an arrangement that it shall cause the edge of the bit to be tilted or inclined toward one side or the other, substantially as set forth.

Fifth, The combination of the transverse sliding bar provided with jaws and projecting arm or spur as described, with a cam or spiral grooved shaft and actuating lever or equivalent means, substantially as herein shown and set forth.

Sixth, The combination with the tilting or movable bed and bit which it supports of the toggle jointed and reversible lever and holding pins in the side of the stock, substantially as herein shown and described.

Seventh, The combination with the movable bed and toggle jointed lever of an adjustable bearing for the said lever, substantially as set forth and described.

Eighth, I claim the adjustable cap herein described, the same consisting of an upper and a lower plate or section connected by an eccentric rod or disk whereby the lower section may be adjusted in its proper relation to the cutting edge of the bit, substantially as shown and described.

Ninth, I claim the combination with the movable section for adjusting the size of the throat, of the knob for securing the same, under the arrangement herein described, so that the said knob shall not only serve to adjust and hold the said section in place but shall also be a handle for giving the movement of the plane, substantially as set forth.

64,791.—HORSE POWER.—D. J. Powers and H. B. Stevens, Madison, Wis., assignors by mesne assignments to Buffalo Agricultural Machine Works.

We claim the drivers platform, D, when resting on a central fixed pivot, C, substantially as and for the purpose herein specified.

We also claim the transferring shaft and wheel G and H, turning around the central pivot, C, for the purpose specified.

We also claim the flanges, m and p p, respectively on the master wheel, B, and pinions, f g, substantially as and for the purpose herein set forth.

We also claim the combination and arrangement of the master wheel, B, fixed pivot, C, drivers platform, D, and transferring shaft and wheel, G, and H, as herein described.

64,792.—HOE.—Arthur Prentiss, Prentiss Vale, Pa.

I claim as a new article of manufacture, a hoe for garden or other use, cut, formed and otherwise constructed as described and shown.

64,793.—INHALER.—Arthur Prentiss, Prentiss Vale, Pa.

I claim an inhaler when formed and its various parts arranged substantially as described and for the purposes set forth.

64,794.—CARRIAGE WHEEL.—Arthur Prentiss, Prentiss Vale, Pa.

I claim the wheel rim or felloe when swaged or otherwise formed into suitable shape of sheet metal either in one or many pieces in combination with the grooved tire, B, either when this grooved tire, B, is made the principle tire or used in connection with the supplemented one as shown in fig. 1.

64,795.—CARRIAGE WHEEL.—Arthur Prentiss, Otto, Pa.

First, I claim the combination and use of the socket, A, when provided with the small socket, E, and the flange, B, all in one piece with the pin or screw, i, and the felly and spoke of a wheel, substantially as described and for the purposes set forth.

I claim the spoke socket and joint clasp composed of the socket, A, flange, B, extended sides, C C, and connecting plate, D, all of one piece of malleable iron or its equivalent for the purpose shown.

64,796.—CAR WHEEL.—John Raddin, Lynn, Mass.

I claim arranging the elastic rubber ring or cushion so as to operate within a space as described formed between the hub and the web or its equivalent and side flanges of a wheel.

64,797.—HARVESTER.—Adam R. Reese, Phillipsburg, N. J.

First. I claim the fingers, h, pivoted to the bar, b, operating in combination with the clearer, g, substantially as and for the purpose specified.

Second, The shaft, K, provided with fingers, d, and arranged to operate in connection with the grain platform, substantially as and for the purpose specified.

Third, The grain supporting bar, T, provided with the oblique teeth, i, and raised and lowered automatically from the grain platform, substantially as and for the purpose set forth.

Fourth, I claim in combination with a harvesting machine, an automatic gavel regulator so constructed that it can be set so as to make the gavels at such different regular distances apart as desired, substantially as set forth

64,798.—BARLEY FORK.—Martin C. Remington, Auburn N. Y.

I claim the metallic head, A, as constructed with its arch, D, and raised socket, E, to receive a straight handle in combination with a bail or bow, B, and brace, G, operating in the manner as and for the purposes herein set forth.

64,799.—SOFA BEDSTEAD.—Stephen C. Roscoe, Obion county Tenn.

I claim the revolving lower cushion or seat of the sofa secured in its position as described in combination with the movable position of the frame passing out of the way and beneath the cushions or seats as herein substantially described.

64,800.—SPINDLE FOR SPINNING MACHINES.—Joseph Marie Ryo Catleau, Paris, France.

First, I claim the method of effecting the automatic retardment of the rotation of the spindle which carries the bobbin, substantially as shown and set forth.

Second, The combination with the spindle which carries the bobbin of the reciprocating tube, and helicoidal inclined planes under such an arrangement that the reciprocating movement of the said tube shall effect the automatic retarding of the rotation of the bobbins, substantially as herein shown and described.

64,801.—WAGON BRAKE.—John W. F. Schultz, Molino, Ill.

I claim the arrangement and combination of the levers, D C F, bar, G, rod, T, lever, H, when the whole is operated in connection with pulleys, I J, and chain, H, substantially as set forth.

64,802.—GATE.—George W. Sizer, Springvale, Wis.

I claim attaching the rear ends of the gate bars, B B B and B' directly to the part, A, with no other frame work and connecting them at the front ends by cross bar, b, and in combination with slotted part, A', the whole constructed substantially as described and operating as and for the purpose set forth

64,803.—BUTTER WORKER.—William E. Skinner, Milford, Mich.

I claim giving the paddle of the butter worker a compound motion in imitation of the motion given to the paddle by a dairy woman, substantially as set forth by the devices described or their equivalents.

And in combination with the paddle having the compound motion above claimed, I claim giving the butter bowl a rotary motion, substantially as described.

In combinaton with the butter worker, I claim the press box with movable sides hinged to its base, substantially as described.

And in combination with the press box above claimed, I claim the traversing follower, substantially as described.

64,804.—LAMP BURNER.—George Smith, Providence, R. I.

First, I claim the application of a spring to the slide or valve, a, which is used for closing the opening through a lamp burner, substantially as described.

Second, The relative arrangement of the laterally movable spring slide, a, with respect to the wick spur button, D, substantially as described.

64,805.—COMPOUND FOR WELDING STEEL.—C. Sparks, Donners Grove, Ill.

I claim the above described compound for welding steel.

64,806.—BEEHIVE.—Solomon Stevens, New Carlisle, Ind.

First, I claim the grooved strips, d d, in combination with the comb frames, e e, substantially as arranged for the purpose and in the manner specified.

I also claim the box, f and tube, g, combined arranged and operating in the manner and for the purpose set forth.

64,807.—MAKING GLASS LETTERS, NUMBERS, ETC.—Otto Stietz, New York City.

I claim a letter formed upon the reverse side of a piece of glass by means of etching in the face of the letter and covering it with a surface of metal or foiling, lapping upon the unetched portion, thereby producing an appearance of relief, substantially as described.

64,808.—DOOR FASTENER.—Horatio N. Taft, Sag Harbor, N. Y.

I claim a combination portable door fastener, constructed, combined and operating substantially as herein shown and described.

64,809.—BUSH FOR SPINDLES FOR GRINDING MILLS.—John H. Teahl, Eberlys Mills, Pa.

I claim the above-described mill bush consisting of the funnel-shaped metal box, D, having conical friction rollers revolving therein and carrying the spindle within the frame that holds the rollers, when constructed and operating substantially as described.

64,810.—GARBAGE BOX.—D. D. Templeton, New York City.

First, I claim the lid, A, constructed substantially as described.

Second, The angular groove, E, in combination with the box, W, and lid, A, substantially as described.

Third, The trap door, L, in combination with the box, k, communicating with the cellar and supporting the receptacles, B, substantially as represented and described.

Fourth, The combination of the garbage and ash box, substantially as described.

64,811.—WEATHER STRIP.—E. S. Torrey, New York City.

I claim the combination of the strip of soft india-rubber, or its equivalent, with a strip or molding of hard rubber, or its equivalent, substantially as and for the purposes herein set forth.

64,812.—BRICK-MOLDING MACHINE.—Timothy Tufts, Somerville, Mass.

I claim the combination of one or more tubular conveyors, C, with the expressing chamber, B, its plunger, E, and mold, D, to operate substantially as specified.

I also claim the combination and arrangement of the covering plate, K, with the carriage, H, one or more tubular conveyors, C, the expressing chamber and its plunger, the whole being provided with mechanism for operating them substantially as specified.

I also claim the combination of the mold-lifting and depressing mechanisms with one or more tubular conveyors, C, the expressing chamber and its plunger, to operate with the mold, as specified.

I also claim the combination of the mold operative carriage, H, with one or more tubular conveyors, C, the expressing chamber, B, and its plunger applied to the mixing reservoir and provided with mechanism for operating them, substantially as specified.

I also claim the combination of the scraper, S, with one or more conveyors, C, the expressing chamber, B, and its plunger, E, to operate with the mold, substantially as set forth.

64,813.—TRUNK LOCK.—Leonhardt Uitting (assignor to C Liebrich), Philadelphia, Pa.

I claim the spring bolt, E, and tumbler, I, or its equivalent, constructed and operating substantially as described, so that a self fastening device and an ordinary locking bolt operated by a key may be combined in one lock.

64,814.—COTTON AND HAY PRESS.—C. Ph. Wagner, New York City.

First, I claim the combination of the vertical screw, C, with the segments, D D, provided with radial arms, E, pivoted by double toggle joints, F F', to opposite sides or ends of the platen operating so as to give to it a variable velocity and action, substantially as specified.

Second, The side braces, M, fitting into shoes, o, at their base and gearing with open hook ends of a cross bar, L, to the lower, the baling box at top, essentially as shown and described.

64,815.—SHIELD FOR PROTECTING WATER BACKS IN RANGES AND STOVES.—M. J. Wellman, New York City.

I claim the metallic plate between the water back and the fire and forming the back of the fireplace and protecting the water back at all times so constructed and arranged as to rest against the water back when the water back is to be heated and to be moved forward and permit a current of air to pass up between the said water back and the fire when the heat of the fire is to be excluded therefrom, as and for the purposes herein set forth.

64,816.—VENTILATING SKY LIGHT.—Norman W. Wheeler, Brooklyn, N. Y.

I claim, First, The combination of the hood, a, frame, B B, and glasses, E E E, or their equivalents, as set forth.

Second, The combination of the hood, a, pan pipes, i i j j, and frame, B B, or their equivalents, substantially as set forth.

Third, The combination of the trunk, r, and glasses, S S S S, with the above, substantially as set forth.

Fourth, The combination of the pipes over and lighted frame, B B, or their equivalents, substantially as set forth.

64,817.—MACHINE FOR GRINDING THE CUTTERS OF HARVESTERS.—Henry Whitall, Woodbury, N. J.

First, I claim a portable machine adapted to grind the cutters of mowing and reaping machines, when arranged and operating in the manner substantially as described.

Second, In combination with a machine constructed substantially as described, I claim the clamp, F, when arranged for joint action with the said machine, as and for the purpose described.

64,818.—HARVESTER.—Wm. N. Whiteley, Jr., Springfield, Ohio.

First, I claim the coupling arm, J, in combination with the circular plate, H, substantially as and for the purpose set forth.

Second, The coupling arm, J, constructed to clasp the sector plate, H, at three points so as not to depend upon the pinion shaft for its center of motion.

Third, The coupling arm, M, mounted and moving upon the horizontal

© 1867 SCIENTIFIC AMERICAN, INC

axle stud, K, through which passes the cutters crank shaft, substantially as and for the purpose set forth.

Fourth, The hook, U, in combination with the flange, V, on the hub of M, substantially as and for the purpose set forth.

64,819.—HARVESTER RAKE.—Wm. N. Whiteley, Jr., Springfield, Ohio.

First, I claim, in combination with a harvesting machine having two adjustable wheels, a hinged cutting apparatus and a raking and reeling mechanism mounted on the inner end of said cutting apparatus rotating about a vertical shaft, F, and counter shaft, D, with their bevel gear connections for the purpose of driving the said reel and rake by a train of gearing from the main pinion shaft and so that the movements of the reel and rake may at all times conform to the position of the finger bar, substantially as set forth.

Second, In combination with a harvesting machine having two wheels and a hinged cutting apparatus, the tubular drag bar, I, rigidly secured to the frame of the machine and forming the center upon which the cutting apparatus vibrates so that the axis of the reel and rake's driving shaft may be coincident with the axis upon which the cutting apparatus vibrates, substantially as set forth.

Third, The collar, T, provided with the notch, Q', in combination with the stop plate, E', and clutch lever, A', substantially as and for the purpose set forth.

Fourth, The clutch lever, A', in combination with connecting rod, B', and head lever, C, constructed and arranged as set forth.

64,820.—VEHICLE.—John G. Wilkinson, Quincy, Ohio.

First, I claim the arrangement of the rocker shaft, F, with its divided lever, H, rods, G G, and crank axle, B, with the frame, D, in the manner substantially as and for the purposes herein specified.

Second, The rocker shaft, F, when constructed in the manner as herein set forth.

64,821.—LOCOMOTIVE TRUCK AND ENGINE.—Joseph P. Woodbury, Boston, Mass.

First, I claim a locomotive engine constructed with horizontal boiler resting entirely on trucks, which have free lateral oscillation independently of the boiler, these trucks being provided with vertical frames, as shown and described for the purpose set forth.

Second, The vertically-acting cylinders, in combination with a frame which oscillates rotatively with the truck independently of the boiler.

Third, The combination and arrangement of the pipes, J, the pipe, F, exhaust pipe, Y, cap, P, and pipes, H.

Fourth, The combination of the circular series of radial rollers, a, with the concentric rings as shown in Fig. 5, holding the axes of the same and the horizontal boiler and the truck.

Fifth, The combination of the operating rod, z, toggle joint, U, and reverse handle, N, as shown in Figs. 1 and 3.

Sixth, The combination and arrangement of the arms, f f, the journal boxes, g g, of the driving wheels, and journal box, S, as shown in Fig. 8.

Seventh, The rod, z', with swivel connections, in combination with the throttle 7 of the forward engine.

Eighth, The swivel plate or yoke, p p, in combination with the engine frame and steam dome.

Ninth, The combination as well as the arrangement of the pipe, F, and its adjunct with the steam dome, D, as shown in Fig. 9.

64,822.—BABY CARRIAGE.—S. Sayre Woodruff, Brooklyn, N. Y.

First, I claim the combination of the pivoted reservoir, tongue, or shafts with the body of the carriage, substantially as herein set forth for the purpose specified.

Second, The combination of the pivoted reversible tongue or shafts, constructed with elastic sides as set forth, with the ears or stops, d and e, formed upon the body of the carriage, substantially as and for the purpose specified.

64,823.—TOBACCO BELTING KNIFE.—Joseph B. Worsham, Hibernia, Mo.

I claim the the belting knife or implement constructed and used substantially as herein shown and described.

64,824.—APPARATUS FOR MASHING AND COOLING IN BREWERIES.—George S. Yingling and Samuel F. Poorman, Tiffin, Ohio.

First, I claim the use of the adjustable bars, D D, provided at their lower ends with the shovels, G G, which are used in connection with the shovels, G G, as and for the purpose set forth.

Second, The arrangement of the shaft, A, with its bars, B E and D, its rounds, C C, and the shovels, G and F, the several parts being constructed and used as and for the purpose herein specified.

64,825.—MEASURING FUNNELS.—John H. Elward, Mendota, Ill.

I claim the combination of the valve, B, rod, C, lever, E, and slotted handle, F, said parts being so constructed and arranged that the lever, E, when the valve is closed, shall form a spring, by the tension of which the parts are held firmly in position, substantially as set forth.

REISSUES.

2,598.—BROOM.—William H. Cory, New York City, assignee by mesne assignments of Thomas Wright. Patented Nov. 13, 1866.

I claim the splints or strips made of any suitable material inserted in bundles through apertures formed in pairs in the base plate of the broom by looping them as described, said apertures being connected by a groove or recess to accommodate the loop and the latter held to its place by a back or upper plate, substantially as shown and described.

2,599.—MACHINE FOR REMOVING SEEDS FROM RAISINS.—Harvey Locke, Grand Rapids, Mich. Patented Nov. 28, 1865.

First, I claim the combination of mechanism for compressing the fruit and ejecting the seeds with a clamp for attaching the raisin-stoning machine removably to a table or support, substantially as set forth.

Second, I claim the combination of the compressing jaw with the grate and expeller, substantially as set forth.

Third, I claim the retainer, G, in combination with the compressing jaw and seed expeller, substantially as set forth.

Fourth, I claim removing the seeds from the expeller, F, by a clearer, H, substantially as set forth.

Fifth, I claim removing the raisin from the machine by the clearer, I, substantially as set forth.

Sixth, I claim the blade, L, in combination with the clearer, H, for the purposes and substantially as set forth.

Seventh, I claim in a machine for stoning raisins the combination of mechanism for compressing the fruit with mechanism for injecting and removing the seeds, substantially as set forth.

2,600.—PIPE CUTTER.—John Balmore, Harlem, N. Y. Patented Feb. 19, 1867.

I claim, First, In a pipe wrench with a hook-shaped jaw, hinged to a nut through which the shank passes, the round cup-shaped point, c, to operate in combination with the hinged hook-shaped jaw, A, in the manner and for the purpose set forth.

Second, The cutter, D, and groove, d, in combination with the shank, C, nut, B, and hook, A, constructed, arranged and operating substantially as and for the purposes set forth.

2,601.—LIGHTNING ROD.—N. Brittan, Chicago, Ill. Patented July 19, 1864.

I claim, First, A lightning conductor consisting of a single continuous flat strip of copper, as herein shown and described.

Second, In combination with the single continuous flat strip, A, I claim the tubular projecting portion, c, as herein set forth.

Third, The points, i, formed of spiral coils, when combined in one piece with the tubular portion, h, and the continuous flat strip, A, as herein shown and described.

2,602.—HARVESTER CUTTER-BAR CONNECTION.—George W. D. Culp, Allensville, Ind., and Wm. D. Keeney, Florence, Ind. Patented Aug. 25, 1863. Div. A.

We claim so connecting the pitman, B, to the cutter bar, A, of a harvesting machine by means of a single conical or conoidal journal, b, passing into a corresponding-shaped socket in the lug, a, and secured therein by a friction plate, C, substantially as and for the purpose set forth.

The set screw, D, in combination with the friction plate, C, conical or conoidal journal, b, and lug, a, substantially as and for the purpose set forth.

2,603.—HARVESTER CUTTER-BAR CONNECTION.—George W. D. Culp, Allensville, Ind., and Wm. D. Keeney, Florence, Ind. Patented Aug. 25, 1863. Div. B.

We claim the conical or conoidal point or journal, H, constructed with a shoulder or collar, h', to form a bearing for the confining plate, I, substantially as and for the purpose set forth.

The single conical or conoidal wrist or journal, H, in combination with the solid box, F, having a corresponding socket and confining plate, I, as described and for the purpose set forth.

2,604.—HARVESTER CUTTER-BAR CONNECTION.—George W. D. Culp, Allensville, Ind., and Wm. J. Keeney, Florence, Ind. Patented Aug. 25, 1863. Div. C.

We claim connecting the pitman of a harvesting machine to the crank or fly-wheel wrist by means of a solid-pivoted box, as and for the purposes set forth and described.

The forked pitman, or its equivalent, provided with pivot points opposite each other in combination with the pivoted box provided with centers for said pivot points so arranged that said box may rock freely, as described and for the purpose set forth.

The center screw, G, or its equivalent, in combination with the pivoted box, F, and pitman, B, for the purpose of taking up the slack on the pivots of the pivoted box, substantially as described.

2,605.—GAS BURNER.—Elliott P. Gleason, New York City, assignee of Amos H. Ray. Patented June 15, 1858.

I claim, First, The construction and arrangement within the burner shell of the corrugated cone, D, the heating tube, G, and a suitable perforation or inlet, c, with the mode of operation substantially as and for the purpose described.

Second, In the construction of a gas burner the use of a tip constructed and secured substantially as described.

2,606.—VISE.—John S. Hoar, West Acton, Mass. Patented June 19, 1866.

What I claim as a special improvement in bench vises, of the kind described, or those to turn horizontally on a bedplate, is the combination of all the several parts of the vise, when constructed and arranged substantially as herein described.

I also claim the particular shape, herein shown and described, of the jaws of the vise, such causing them to be eccentric with respect to the shank, E.

2,607.—BAROMETER INKSTAND.—Thomas S. Hudson, East Cambridge, Mass. Patented June 4, 1861. Reissued Nov. 15, 1864.

I claim the improved barometric inkstand consisting of the combination of the dip basin, elevated ink cistern, hollow connecting arm and shell base, substantially as before set forth.

I also claim the combination of the dip-basin, elevated ink cistern, hollow connecting arm and base, with a collar secured to the dip-basin, substantially as set forth.

I also claim the combination of the dip-basin, elevated ink cistern, hollow connecting arm and base, with a tunnel cup, substantially as before set forth.

I also claim the combination of the dip-basin, elevated ink cistern, hollow connecting arm and base, with a cover for the dip-basin, substantially as before set forth.

2,608.—HARVESTER.—Philo Sylla, Elgin, Ill., and Augustus Adams, Sandwich, Ill., assignees by mesne assignments of themselves. Patented September 20, 1853. Reissued May 17, 1859.

We claim, First, The combination of a finger beam, with slotted guard fingers, a reciprocating scolloped cutter, a double hinge connection between the finger beam and the main frame, and a driving shaft for the cutting apparatus, parallel or nearly so, to the ground.

Second, The combination of a double hinge floating finger beam with slotted guard fingers, a reciprocating scolloped cutter and a removable platform for converting the machine from a mower to a reaper.

Third, The combination of a finger beam with slotted fingers, a reciprocating scolloped cutter, a hinged connection to the main frame, a removable platform, and a reel.

Fourth, The combination of a finger beam with slotted fingers, a reciprocating scolloped cutter, a hinged connection to the main frame, and arms or levers, or their equivalents, for adjusting the hight of the cutting apparatus.

2,609.—MACHINE FOR WRINGING CLOTHES.—The Bailey Washing and Wringing Machine Company, Woonsocket, R. I., assignees by mesne assignments of S. A. Bailey. Patented April 5, 1859. Reissued June 28, 1864.

We claim, First, The employment of the wooden spring piece, a a, which is divided into two parts at its center, each part being slotted from the place of division, as shown in the drawing, towards its outer end, the same being covered by rubber cylinder, substantially in the manner and for the purpose specified.

Second, The spring, F, in combination with elastic rollers for the purpose set forth.

Third, We claim, in a wringing machine, substantially of the kind herein described, the combination of elastic rollers, impervious to water, with the standards, B, and vessel, A, secured and operated substantially as and for the purpose specified.

2,610.—HARVESTER.—Cyrenus Wheeler, Jr. Auburn, N. Y. Patented Dec. 5, 1854. Reissued Jan. 3, 1860.

I claim in combination with a harvester frame that is free to vibrate about a gear center, a laterally projecting finger bar, so hinged to one end or corner of said frame, as to permit the finger bar at each end to follow the undulations of the ground over which it is drawn.

2,611.—METHOD OF RAISING AND LOWERING THE CUTTER OF HARVESTERS.—C. Wheeler, Jr. Auburn, N. Y., assignee by mesne assignments of Jonathan F. Barrett. Patented July 10, 1865.

I claim, First, The combination of the frame carrying the cutting apparatus, vibrating about a gear center, and the vibrating draft frame.

Second, I also claim the combination of the frame carrying the cutting apparatus vibrating about a gear center with a vibrating draft frame and the lever or its equivalent for raising and lowering the cutting apparatus attached to said frame.

Third, I also claim the combination of the draft frame attached directly to the axle of the driving wheels with a frame carrying the cutting apparatus, vibrating about a gear center.

Fourth, I also claim the combination of a vibrating draft frame a frame carrying the cutting apparatus vibrating about a gear center and a drivers seat attached to said draft frame.

2,612.—BASE BURNING STOVE.—Dennis G. Littlefield, Albany, N. Y. Patented Dec. 9, 1862. Antedated Nov. 26, 1862.

I claim, First, The mill grate, B A B, constructed and operating substantially as and for the purpose herein described.

Second, I also claim the flaring portion of the center case, M', in combination with the furnace, D, substantially as and for the purpose described.

Third, I also claim the furnace, D, opening into and in combination with the chamber E E E, and so constructed as to emit both light and heat from the burning coal, in an upward direction, substantially as and for the purpose set forth.

Fourth, I also claim in combination with the subject matter of my third claim, the plates, f f and c c, which form the floor of the chamber, E E E, and a register opening from the ash pit, substantially as and for the purposes set forth.

Fifth, I also claim the compelling of the draft from the grate while the fire is kindling and previous to and during the process of replenishing the magazine to pass through the magazine for the purpose specified, by the means I have divised or by any other analogous devices.

Sixth, I also claim the chamber, I, communicating with the flue, P, whereby air finding admission through the aperture over which rests the cover, R, passes at once to the exit flue, as specified.

Seventh, I also claim the divided flue, K, around the chamber, I, and forming a communication between the chambers, E E E, and the flue, P, whereby the products of combustion are drawn to the smoke pipe and chimney and the heat rendered more effective by its proper diffusion within the burner as herein set forth.

Eighth, I also claim the plate, V, forming the top of the magazine, and projecting out over it, to the outer case, and having apertures, o, at the front side, and another u, into the flue, P, as described, substantially as and for the purposes set forth.

Ninth, I also claim such adjustment of parts of the magazine stove, as will carry the whole volume of the heated products of combustion to the front region of the stove, and thence to the rear part of it, over the top of the magazine in the manner I have described or by any other analogous devices.

Tenth, I also claim the gate like sliding cover, N, in combination with the magazine, H, as and for the purpose herein set forth.

Eleventh, I also claim the inward deflection of the case, M2, in its relation to, and combination with the furnace, and chamber, E E E, substantially as and for the purposes set forth.

Twelfth, I also claim the window openings in the outer case at M2, in combination with the recession of the case, substantially as and for the purposes set forth.

2,613.—MACHINE FOR SHEARING SHEEP.—Richard B. Walker and Lewis Miller, Akron, Ohio, assignees of John W. Jenkins. Patented Oct. 21, 1856.

First, We claim a flexible and extensible connection, between the stationary or first moving power, and the shears, whereby the shears may, while cutting, be moved over and around the body of the animal, substantially as described.

Second, I also claim so constructing the shears of a power shearing machine, as that it can be held and guided by one hand, leaving the other hand of the operator free, substantially as described.

Third, I also claim encasing the mechanism that drives the shears, so that the wool or fleece cannot become entangled therein, substantially as and for the purpose set forth.

Fourth, I also claim driving the vibrating arm to which the moving shear or cutter is attached, directly from an eccentric, substantially in the manner described.

Fifth, I also claim a guard plate or projection under the stationary fingers to regulate the hight as well as the length of cut at each vibration of the shear, substantially as described.

Sixth, I also claim a presser to regulate the pressure of the vibrating knife or shear upon the stationary fingers, substantially as described.

Seventh, I also claim the placing or locating of the power by which the shears are vibrated remote from the shears, thus leaving the hands of the operator free, one to hold the animal, the other to guide and direct the shears, substantially as described.

Eighth, I also claim so attaching the fingers to the bed plate, as that they can be readily detached for being sharpened, substantially as described.

Ninth, I also claim the arrangement of a slotted vibrating plate or sway bar, so that a wrist may give motion to it laterally without moving it longitudinally, substantially as described.

Tenth, I also claim guiding and directing the cutters or shears by the hand of the operator, when said cutters are driven by power independent of said operator, substantially as described.

2,614.—SHEEP-SHEARING MACHINE.—Richard B. Walker and Lewis Miller, Akron, Ohio, assignees of John V. Jenkins. Patented Sept. 8, 1857.

I claim attaching or suspending the cutter and its connections to an extended or projecting arm, substantially as and for the purpose described.

I also claim transmitting the power to drive the shear cutter, through or by means of one or more endless belts, and one or more shafts and one or more universal joints, whereby greater range of motion can be given to the cutter, and increased facilities to the operator in guiding them and in managing the animal to be sheared, substantially as described.

2,615.—MACHINE FOR SHEARING SHEEP.—Lewis Miller and Richard B. Walker, Akron, Ohio, assignees by mesne assignments of A. H. Kennedy. Patented Jan. 30, 1866.

First, I claim the extension arm made with a hinge so that it can be raised or lowered at the will of the operator, substantially as and for the purpose set forth

Second, I also claim in combination with the extended arm, the balancing of it, so that the operator shall be relieved of the weight of the arm in raising it, and also for the purpose of taking up the slack of the connecting shaft, substantially as described.

Third, I also claim the coiled wire shaft for transmitting the driving power to the shears, substantially as described.

Fourth, I also claim spanning or extending the arm, C, over the driving shaft and pulley, for the purpose of better support, more strength, and greater compactness, substantially as described.

DESIGNS.

2,652.—BOTTLE.—Samuel A. Whitney, Glassboro, N. J.

2,653.—FLOOR OIL CLOTH OR CARPET PATTERN.—Charles T. Meyers, Bergen, N. J. assignor to Edward C. Sampson, New York City.

2,654.—SPOON OR FORK HANDLE.—Horace C. Wilcox, West Meriden, Ct.

Inventions Patented in England by Americans.

[Condensed from the "Journal of the Commissioners of Patents."]

PROVISIONAL PROTECTION FOR SIX MONTHS.

865.—CENTRAL-FIRE CARTRIDGE FOR BREECH-LOADING FIRE-ARM.—Benj. S Roberts, Maj. Gen. U. S. Army. March 20, 1867.

806.—SEWING MACHINE.—Sidney M. Tyler, Brooklyn, N. Y. March 20, 1867.

827.—STEAM HEATING AND VENTILATING APPARATUS.—Adolph Sternfeld, Boston, Mass. March 21, 1867.

828.—APPARATUS FOR SEPARATING THE GROUNDS FROM THE LIQUID IN MAKING COFFEE.—Henry J. Grisword, Boston, Mass. March 23, 1867.

853.—REINS FOR HORSES.—John Muir, Mary A. W. Ringler, and Sarah E. Kelly, New York City. March 23, 1867.

855.—APPARATUS FOR EXTINGUISHING LAMPS.—Nathaniel Mansfield, Boston, Mass. March 23, 1867.

859.—ROTARY DIGGING MACHINE, AND TEETH FOR THE SAME.—George G. Lobdell, Wilmington, Del. March 25, 1867.

971.—PAPER MACHINERY.—Francis Curtis, Newton, Mass. April 1, 1867.

854.—JUMPING OR SKIPPING HOOPS.—Charles L. Browne, Brooklyn, N. Y. March 23.

858.—COTTON-BALE TIE, ETC.—Henry Fassmann, New Orleans, La. March 25, 1867.

864.—MACHINERY FOR CUTTING CHANNELS IN STONE, ETC.—George J, Wardwell, Rutland, Vt. March 25, 1867.

866.—BREECH-LOADING FIRE-ARMS AND CARTRIDGES.—Loughlin Conroy and Tristram D. Vanderveer, New York City. March 25, 1867.

871.—STEAM AND VACUUM GAGE.—Emmett Quinn, Washington, D. C. March 26, 1867.

876.—SCREWS.—Valentine Fogerty, Boston, Mass. March 26, 1867.

882.—VALVE GEAR OF STEAM ENGINES.—William Wright, New York City. March 26, 1867.

883.—LOOMS.—Erastus B. Bigelow, Boston, Mass. March 26, 1867.

894.—MACHINE FOR PAINTING METALLIC SURFACES, ETC.—Henry Fassmann, New Orleans, La. March 27, 1867.

919.—APPARATUS FOR CONCENTRATING THE EXTRACTS OF BARK FOR TANNING AND OTHER PURPOSES.—Benjamin Irving, New York City. March 28, 1867.

3,429.—FASTENING FOR POCKET BOOKS, DIARIES, ETC.—John Dubber and Carlos Bardwell, N. Y. Dec. 29, 1866.

912.—SADDLE STIRRUPS.—Osborne Macdaniel, New York City. March 28, 1867.

920.—MODE OF AND MACHINERY FOR OBTAINING THE EXTRACTS OF BARK FOR TANNING AND OTHER PURPOSES.—Benjamin Irving, New York City. March 28, 1867.

951.—COUPLING TELEGRAPH AND OTHER WIRES.—David McComb, Memphis, Tenn. March 30, 1867.

958.—BROOM.—Eli P. Cooley, New York City. March 30, 1867.

965.—COMPOSITION FOR TREATING FLUIDS EMPLOYED FOR ILLUMINATING PURPOSES.—Hiram B. Wellman, Indianapolis, Ind. April 1, 1867.

966.—MODE OF AND MEANS FOR CLOSING AND FASTENING THE PORT LIGHTS OF SHIPS AND OTHER VESSELS.—Edward S. Hidden, New York City. April 1, 1867.

970.—SEWING MACHINERY.—James A. House and Henry A. House, Brooklyn, N. Y., April 1, 1867.

978.—APPARATUS FOR MANUFACTURING BOXES FROM SHEETS OF PAPER, METAL, AND OTHER MATERIAL.—Bryant Clarke, New York City. April 2, 1867.

930.—CENTRIFUGAL SUGAR MACHINE.—Alexander Mackey, New York, and Eberhard Muller, Williamsburgh, N. Y. April 2, 1867.

1,007.—REVOLVING BREECH-LOADING FIRE-ARMS.—Wm. Herrick, New York City. April 3, 1867.

1,045.—COMBINED WATER METER AND FORCE PUMP.—Elihu Spencer and Thomas Stephens, New York City. April 6, 1867.

EXTENSION NOTICES.

Julius Herriet, of New York City, having petitioned for the extension of a patent granted to him the 2d day of August, 1853, for an improvement in elastic type for printing on irregular forms, for seven years from the expiration of said patent, which takes place on the 2d day of August, 1867, it is ordered that the said petition be heard at the Patent Office on Monday the 15th day of July next.

William Miller, of Pensacola, Florida, administrator of the estate of Joseph B. Miller, late of Jersey City, N. J., deceased, having petitioned for the extension of a patent granted to the said Joseph R. Miller the 2d day of August, 1853, for an improvement in submarine tunnels, for seven years from the expiration of said patent, which takes place on the 2d day of August, 1867, it is ordered that the said petition be heard at the Patent Office on Monday the 15th day of July next.

James C. Cooke, of New Haven, Conn., having petitioned for the extension of a patent granted to him the 27th day of July, 1852, and reissued the 7th day of April, 1863, for an improvement in forming button backs and connecting the eyes thereto, for seven years from the expiration of said patent, which took place on the 27th day of July, 1866, this application having been authorized by Act of Congress, it is ordered that the said petition be heard at the Patent Office on Monday the 29th day of July next.

Thomas Crossley, of Bridgeport, Conn., having petitioned for the extension of a patent granted to him the 16th day of August, 1853, for an improvement in printed carpets, for seven years from the expiration of said patent, which takes place on the 16th day of August, 1867, it is ordered that said petition be heard at the Patent Office on Monday, the 29th day of July next.

NEW PUBLICATIONS.

PART FOUR OF THE MECHANICIAN AND CONSTRUCTOR FOR Engineers, by Cameron Knight, is received. The plates and text still relate to the details of engine forging, and comprehend some excellent examples. We heartily commend this work to engineers and machinists. It can be obtained of D. Van Nostrand, corner of Broadway and John street, this city.

SCREW PROPELLER, SCREW VESSELS, AND SCREW ENGINES, by John Bourne, C. E., Part XIX., for April, is at hand. This number contains plans and drawings of the screw steamers *European* and *Frankfort*, the U. S. turret vessels *Chickasaw* and *Nausset*, and plans of engines and boats for canal service. The number sustains the previous high character of the work. Van Nostrand is agent for the series.

BEET ROOT SUGAR, and its Cultivation. By E. B. Grant. Boston: Lee & Shepard. For sale by D. Van Nostrand, New York.

This book fully reviews the whole field, states results in France and elsewhere, and warmly urges beet culture for sugar in this country.

THE PEAT JOURNAL. By Leavitt & Hunnewell, and for sale by D. Van Nostrand.

This volume glorifies peat to the utmost possible degree, alleging that it is found in almost every State of the Union, and that it is good, not only as a fertilizer, but serviceable for fuel, gas, gunpowder, pavements, paper, buildings, tanning, embalming, disinfecting, etc., etc.

MANUAL OF ELEMENTARY GEOMETRICAL DRAWING. By S. Edward Warren, C.E. New York: John Wiley & Son, 535 Broadway.

This book explains the process of construction in wood and mason work, and is designed for schools and for the self-instruction of inventors, artizans, etc. It is what its title imports, a valuable volume for beginners. We have before noticed Mr. Warren's "Problem of Shades and Shadows," and welcome every addition from his pen to the domain of science. His works are always clear, comprehensive, and valuable.

THE MANAGEMENT OF STEEL. By George Ede. From Fourth Edition, Revised and Enlarged. New York: Appleton & Co., 443 Broadway.

We have had occasion several times to quote from the treatise of Ede on steel, and feel gratified at the appearance of this reprint. His book should be found in the collection of every worker of steel, as it contains more facts with less twaddle, more useful suggestions with less assumption of superior knowledge, on this subject, than any other treatise with which we are acquainted. It is a really valuable work.

© 1867 SCIENTIFIC AMERICAN, INC

READ THIS.—
For Sale—5 Patents, 5 Patents applied for, and 12 others ready for application. Address
L. S. LIFFINWELL, New York Post Office.

WANTED—AGENTS. Great Inducements offered in selling Crowell's Scissor Sharpener. Sample sent by mail on receipt of 50 cents.
G. W. CROWELL & CO., Cleveland, Ohio.

FOR SALE.—A 25-horse Corlies & Nightengale Engine and Tubular Boiler, in good order. Apply to
R. HOE & CO.,
31 Gold street, New York.

BLAST-Furnace Pyrometers. Metallic Pyrometers for Blast Furnaces, correct and reliable, for sale by CHAS. W. COPELAND, No. 171 Broadway, N. Y.

$20.00 AGENTS WANTED—$100.00.—Male and female, to introduce our New Patent Star Shuttle Sewing Machine. It is adapted for family use and Tailoring. It makes a stitch alike on both sides. Price only Twenty Dollars. Extraordinary inducements to Agents. For full particulars, address W. G. Wilson & Co., Cleveland, Ohio.

GRANITE QUARRY FOR SALE.—
Two thirds of an inexhaustible Granite Quarry, 4 miles from Richmond, Va., on Danville Railroad. This Quarry produces the best granite in the world. A sample can be seen at our office. OBER, NANSON & CO.,
22 4] 43 Broad street, New York.

HOP PRESS WANTED—
For packing hops in pound and half pound packages. Address, stating price and capacity,
22 3*] F. W. LAUER, Box 406, Reading, Pa.

NEW AND ENLARGED EDITION.

D. APPLETON & COMPANY,
413 AND 445 BROADWAY,
Publish this day:

THE MANAGEMENT OF STEEL.
By GEORGE EDE,
Employed at the Royal Gun Factories' Department, Woolwich. From Fourth English Edition, Revised and Enlarged. 1 vol. 12mo, cloth, price....$1 50.
☞ Sent free by mail on receipt of the price.
"This is a valuable work to Machinists and workers in Iron and Steel."—Portland Courier.
"An instructive work: it imparts a great deal of valuable information."—Hartford Courant. 22 1

Just Issued:

THE MODERN CARPENTER AND BUILDER, A new work on Construction, illustrating and explaining every cut in Carpentry, Joinery, and Hand Railing, by new and original Methods. It will be immediately adopted by all who wish to keep pace with this progressive age.
No work of equal value to the carpenter, builder, and architect has ever appeared in this or any country. Its superiority over all other works on the subject it treats will at once be admitted in a direct examination of the plates and drawings and practical exercise of the new method presented. Each plate will be found of more interest and importance to the mechanic than entire volumes of those who profess to teach the art of constructive carpentry.
It embraces all the improvements known to American, French, and Italian architects, with reference to stone cutting, stair building, hand railing, working of metals, and everything connected with building. Advance sheets have been examined by builders of large experience, and its simple and beautiful methods have been universally commended.
The object of the work is to lay before the workman a system which has been tested by experience and actual practice, and to show the most simple methods by which to execute with certainty any part of carpentry, joinery, hand railings, etc.
It contains fourteen large plates, thirteen by ten inches.
Its value will be appreciated when it is known to be by Robert Riddell, author of "Elements of Hand Railing," and to comprise all contained in that, with many valuable additions.
Price $5.00, by mail, pospaid.

CARPENTRY MADE EASY. By Wm. E. Bell. 38 Plates.
This is the Best Work on Carpentry ever published. Any one of the plates is worth the full price of the Work. A few copies only of the Book on hand. Price $6 per copy, *net*.
HOWARD CHALLEN, Publisher,
No. 1308 Chestnut street, Philadelphia, Pa.

THE TRADE Supplied with Iron, Brass, and Wood Pumps and Pipe for all purposes and locations, by GEO. MARSHALL,
21 2—P.] Works 21 Dunham Place, Brooklyn, E. D., N. Y.

THE BEST IN AMERICA.
J. BRINKERHOFF'S
CORN SHELLER, SEPARATOR, AND CLEANER.
Patented April 12, 1864, and Feb. 28, 1865.

This machine has been selected by the Advisory Committee for J. C. Derby, U. S. Agent, as the best in America, and has been sent to Paris to the Universal Exposition. Was also drew the first premium at the New York State Fair, held in 1866, the Committee pronouncing it the Best Corn Sheller they ever saw. It shells, separates, and cleanses rapidly and easily at one operation, as fast as the ears can be put in the hopper.
For territory and agencies in Pennsylvania and Maryland address WM. WIBLE, Box 246,
22 2*] Gettysburg, Pa.

READ THIS.—THE UNDERSIGNED has for sale a new invention; patent applied for. For particulars address, with stamp, J. H. M. C. M. E., Hillsboro, Montgomery Co., Ill. 20 3*

MACHINES FOR WORKING FANS, Models, and devices in show windows, and cases. Price $10. Machine is moved by a spring, and is 11½ by 16 inches. WALKER & SNEDEN,
20 3*] 85 McWhorter street, Newark, N. J.

PERSONS OWNING PATENTS FOR Burning Bricks, or Processes for Drying Bricks, please address Post-office Box 2861, St. Louis, Mo. 21 2

WANTED.—
A Foreman for an Agricultural Machine Shop. Address Box 612, Penn Yan, N. Y. 20 4

THE "McGOWAN" AND "BUCKEYE" Patterns Double-acting Hand and Power Pumps. Patented 1863, for railroads, factories, mills, etc. Manufactured by McGOWAN BROTHERS, 94 and 96 Elm St., Cincinnati, Ohio. Send for circular. 16 13*

RICHARDSON, MERIAM & CO.,
Manufacturers and Dealers in
DANIELS'S AND WOODWORTH PLANERS,
Boring, Matching, Molding, Mortising and Tenoning Machines, Scroll, Cut-off, and Slitting Saws, Saw Mills, Saw Arbors, Spoke and Wood-turning Lathes, and other woodworking Machinery. Warehouse, 107 Liberty street, New York. Manufactory, Worcester, Mass. 18 tf

$200 A MONTH IS BEING MADE with our IMPROVED STENCIL DIES, by Ladies and Gentlemen. Send for our free Catalogue containing Samples and Prices. Address
14 tf—R.] S. M. SPENCER & CO., Brattleboro, Vt.

"HEALTH," "WORK" "WEALTH."
Would you have Light Work, Good Pay, and Plenty of it? Send stamp for New List of Good Books for Agents, to S. R. WELLS,
19 4] 389 Broadway, New York.

MACHINERY.—WE HAVE ON HAND and can supply at short notice Iron and Wood Working Machinery, Steam Engines, Saw Mills, &c. General Agents for Judson's, Snow's and Pickering Governors. HUTCHINSON & LAURENCE,
19 4 No. 8 Dey street, N. Y.

CHARLES A. SEELY, CONSULTING and Analytical Chemist, No. 26 Pine street, New York. Assays and Analyses of all kinds. Advice, Instruction, Reports, etc., on the useful arts. 1 tf

JOSEPH C. CLAYTON,
COUNSELLOR-AT-LAW,
ADVOCATE IN PATENT CAUSES,
Intelligencer Building, Washington City, D. C. B 10*

LEE'S MOLDING MACHINES.—TO get the best patent four-sided Molding and Sash Machines in the market address H. D. LEE,
20 6* Worcester, Mass.

MERRIMAN'S PATENT BOLT CUTTER—Unrivaled by any; cuts V, half V, square, or round threads at one cut, with three dies instantly adjustable to the slightest variation, and opening to release the bolt. The dies are inserted or withdrawn without turning a nut or screw. Foreign patents for sale. Circulars sent by the manufacturers, H. B. BROWN & CO.,
20 tf New Haven, Conn.

FOR SALE—
A FOUNDERY, MACHINE SHOP AND PLANING MILL, at WAUKEGAN, Ill.,
Well supplied with suitable patterns and flasks, including four sizes of Stationary Engines, Barn-door Hangers, and Rail Patterns, Flasks, and shop-right of Leonard's Patent Seamless Thimble Skeins. Good and suitable machinery for finishing. The Planing Mill has Matcher, Surfacer, and Re-sawing Machine, and complete machinery for sash, blinds, doors, etc. Will be sold low for prompt pay. Apply to TIFFANY & LUCAS, at Waukegan. 20 5*

NOTICE.—First-Class Steam Engine for Sale at the Watervliet Arsenal, West Troy, N. Y. 1 Stationary Horizontal Steam Engine, 15-in. Cylinder, and 4-ft. stroke, in good order, and of excellent construction and workmanship, and sold only because it will no longer be needed.
The Engine is now in daily use at the Arsenal, and can be examined every working day by any one wishing to purchase. Offers will be received, subject to approval of the Chief of Ordnance. For sale subsequent to 10th of May, 1867.
P. V. HAGNER,
Byt. Brig. Gen., U. S. A.,
Commanding Arsenal.
Watervliet Arsenal, N. Y., April 5th, 1867. 17 6

AMES' Celebrated Portable and Stationary STEAM ENGINES,
All Sizes, and Superior to all others. Also,
PAYES' PATENT TRIP HAMMER.
Write for Circular. [15 12*] H. M. AMES, Oswego, N. Y.

WATER WHEELS.—
The Helical Jonval Turbine is manufactured by
15 tf] J. E. STEVENSON, 40 Dey street, New York.

TO RAILROAD MEN, CAPITALISTS AND OTHERS.
For Sale, several valuable Patents in the United States of America, viz:
First, For the manufacture of Railroad Frogs and Filled wing Rails.
Second, For bracing the ends of Rai road Rails with steel and for other purposes.
Third, Reversible Forge Rolling Machine for re-rolling and repairing Rails, and forging all kinds of Malleable metals.
Fourth, A new Railroad track, with nut lock latch, etc.
The value of these Patents has been fully tested by "The Steel, Iron & Railway Works Co.," Toronto, who have purchased the Patent rights for the Province of Canada, at whose works on Strachan Avenue, Toronto, the machinery connected with the working of the Patents can be seen in operation.
Address, JOHN L. BLAIKIE, Esq., Toronto, Canada.
Refference is permitted to
George L. Reid, Esq., Engineer Great Western Railroad of Canada, Hamilton, Canada.
E. P. Hannaford, Esq., Engineer Grand Trunk Railroad, Montreal, C. E.
C. J. Brydges, Esq., General Manager, Grand Trunk Railroad, Montreal, C. E.
Frederick Cumberland, Esq., Manager Northern Railroad of Canada, Toronto, C. W.
Toronto, C. W., March 19, 1867. 15 13*

$20 PER DAY.—
Agents wanted in every State to introduce Purington's Alarm Money Drawer. For terms address
15 13*] A. S. TURNER, Willimantic, Ct.

TO ENGINE BUILDERS.—
Ross' Celebrated Patent Oil Cups for Cylinders or Engines, Brass and Iron body, Globe & Check Valves, Gage Cocks, Whistles, etc., on hand and made to order. Price list sent on application. B. E. LEHMAN,
15 8*] Lehigh Valley Brass Works, Bethlehem, Pa.

MALLEABLE IRON CASTINGS
of every description made to order. Address
14 20*] OLNHAUSEN & CRAWFORD, Pittsburgh, Pa.

TRADE BARTLETT'S MARK.
REVERSIBLE
SEWING MACHINES.
Now acknowledged to be
THE CHEAPEST GOOD SEWING MACHINES.
Address J. W. BARTLETT, Patentee, 569 B'd'y, N. Y. 21 tf

FOR STEAM ENGINES, Broughton's Patent Lubricators, Transparent Oil Cups, and Compression Gage Cocks, simpler, easier to manage, and more durable and effective than any others in the market, send for illustrated catalogue. BROUGHTON & MOORE,
21 4*] 41 Center street, New York.

SICCOBAST—A HASTY DRYER FOR Linseed Oil. The most wonderful discovery ever made for this purpose. Mixed with rawlinseed oil in the proportion of
3 gallons to 100 gallons it dries in 18 hours,
5 gallons to 100 gallons it dries in 12 hours.
10 gallons to 100 gallons it dries in 6 hours.
It is entirely free from acid or alkali. The oil works as free as the untreated, and the albumen which the oil contains remains in a natural state and dries with more gloss than boiled oil. Prepared and sold only by
ASAHEL WHEELER,
21 4*] 67 Water street, Boston.

NEW SPENCER THOMAS' Hemlock-Bark Extract—Best and Cheapest Substance known for removing and preventing scale in Steam Boilers. Has been thoroughly tested. Price 6 cents per lb., in boxes of 167 lbs. Remit Ten Dollars and I will send a Box by cheap freight, with circular and directions for use.
W. SPENCER THOMAS,
21 5] Painted Post, Steuben county, N. Y.

GREAT SAVING IN FUEL AND INcrease of Power by using Pure, Dry Steam. Carvalho's improved Steam Superheater furnishes such steam of any desired temperatures for all purposes. It is easily attached to boilers, is very durable, and pays for itself in a few months. Address for circulars, etc., HENRY W. BULKLEY, General Agent, 70 Broadway, N. Y. 21 8

TO MANUFACTURERS OF TEXTILE FABRICS.—Dutcher's Patent Temples, adapted to weaving all kinds of goods; also, Thompson's Patent Oil Cans for oiling Machinery—neat and economical; also, Patent Shuttle Guides which will protect the weaver and save the owner the cost of the guides every year. Furnished by E. D. & G. DRAPER,
6 11* cow] Hopedale, Mass.

ALCOTT'S CONCENTRIC LATHES.—
For Broom, Hoe, and Rake Handles, Chair Rounds, etc., and all other kinds of Wood-working Machinery, for sale by S. C. HILLS, 12 Platt street, New York. 2 6b

500 AGENTS Wanted in a new business.
11 13* N.] H. B. SHAW, Alfred, Me.

ROLLING MILL ENGINES—WITH Sault's patent Frictionless Slide Valve, link motion reverse gear, shafting, hangers, mill gear, etc. Address
11 23* tf] M. & T. SAULT, New Haven, Conn.

PATENTEES TAKE NOTICE.
Having made large additions to our works, we can add one or two machines to our list of manufactures. The machines must be strictly first class, and well protected.
BLYMYER, DAY & CO., Manufacturers of Agricultural Machines and Tools Mansfield, Ohio. 9 tf

THE CELEBRATED "SCHENCK" WOODWORTH PLANERS,
WITH NEW AND IMPORTANT IMPROVEMENTS,
Manufactured by the
SCHENCK MACHINE CO., MATTEAWAN, N. Y.
JOHN B. SCHENCK, President.
T. J. B SCHENCK, Treas. 11 tf

STEEL LETTER CUTTING, BY
16 9*] H. W. GORDON, Lynn, Mass

E. F. PAGE & CO.,
Manufacturers of Patent Stretched
LEATHER BELTING
And Dealers in Manufacturers 'Supplies.
17 13*] 46 Congress street, Boston, Mass.

PORTABLE AND STATIONARY Steam Engines and Boilers, Circular Saw Mills, Mill Work, Cotton Gins and Cotton Gin Materials, manufactured by the ALBERTSON & DOUGLASS MACHINE CO., New London, Conn. 14 tf

AGENTS FOR THE SALE OF MANUfactured Implements and Machines, also for the sale of really desirable Patent Rights. Correspondence solicited. We refer to T. C. Grannis, No. 41 Fulton street, N. Y., and Jesse A. Locke, No. 46 Congress street, Boston.
WILLARD & GUNN,
21 3*] 210 North Fifth street, St. Louis, Mo.

JUST PUBLISHED—UNITED STATES Census in Pocket Form, by States, Counties, and Towns. Just what every patent man wants. 174 pages. Post paid, 60c., four for $2.
21 5* A. WOODWORTH, Cambridge, N. Y.

TO MOLDERS.—
WANTED—A Foreman to take charge of our Foundery. To a man thoroughly acquainted with the business we will give good wages and constant employment. Address, with reference, SNEAD & CO.,
Market street Architectural Foundery,
20 3] Louisville, Ky.

PATENT SHINGLE, STAVE, AND Barrel Machinery, Comprising Shingle Mills, Heading Mills, Stave Cutters, Stave Jointers, Shingle and Heading Jointers, Heading Rounders and Planers, Equalizing and Cut-off Saws. Send for Illustrated List.
FULLER & FORD,
16 tf—C.] 282 and 284 Madison street, Chicago, Ill

THE McKAY SEWING MACHINE, the only machine in existence by which a sewed boot or shoe can be made. Adapted to all kinds, styles and sizes of boots and shoes. 200 pairs can be made with ease by one man, with one machine, in ten hours. These shoes take precedence of all others in the market, and are made substantially at the cost of pegging. In use by all the leading manufacturers. Machines, with competent men to set them in operation, furnished at one day's notice. For particulars of license apply to
GORDON McKAY, Agent,
17-13*—N 6 Bath street, Boston, Mass.

STEAM ENGINES.—COOK, RYMES & Co.'s celebrated first-class stationary, portable and hoisting engines constantly on hand, at their warerooms, 107 Liberty street, New York. 22 tf

AIR SPRING FORGE HAMMERS ARE made by CHAS. MERRILL & SONS, 556 Grand street, New York. They will do more and better work, with less power and repairs, than any other Hammer. Send for a circular. 4 tf

FOR ENGINE BUILDERS' AND STEAM Fitters' Brass Work, address
F. LUNKENHEIMER,
10 26*] Cincinnati Brass Works.

NITRO-GLYCERIN.—
UNITED STATES BLASTING OIL CO.—We are now prepared to fill all orders for Nitro-Glycerin, and respectfully invite the attention of Contractors, Miners and Quarrymen to the immense economy in the use of the same. Address orders to
JAMES DEVEAU, Sec.,
2 52*] 32 Pine street, New York

GOULD MACHINE COMPANY,
Of Newark, N. J., and 102 Liberty street, New York.
IRON AND WOOD-WORKING MACHINERY,
STEAM ENGINES, BOILERS, SAW MILLS, ETC. 14 tf

ANDREWS'S PATENT PUMPS, ENGINES, etc.—
CENTRIFUGAL PUMPS, from 90 Gals. to 40,000 Gals. per minute, capacity.
OSCILLATING ENGINES (Double and Single), from 2 to 250 horse-power.
TUBULAR BOILERS, from 2 to 50 horse-power, consume all smoke.
STEAM HOISTERS to raise from ½ to 6 tuns.
PORTABLE ENGINES, 2 to 20 horse-power.
These machines are all first-class, and are unsurpassed for compactness, simplicity, durability, and economy of working. For descriptive pamphlets and price list address the manufacturers, W. D. ANDREWS & BRO.,
1 tf No. 414 Water street N. Y

WHEELER & WILSON, 625 BROADway, N. Y.—Lock-stitch Sewing Machine and Buttonhole do. 1t

SOLID Emery Wheels—Silicate or Vulcanite. N. Y. Emery Wheel Co., 94 Beekman st., N. Y. 1510*

FIRST-CLASS MACHINISTS' TOOLS.
PRATT, WHITNEY & CO.,
Flower street, Hartford, Conn.,
Manufacturers of Engine Lathes (15) fifteen inches to (8) eight ft. swing; Power Planers, (16) sixteen inches to (5) five feet wide, and of any length desired, and special machinery. Also only makers of Engine Lathes with Slate's Patent Taper Attachment, conceded by all who have used it to be most perfect and simple in its construction and almost indispensable for good workmanship.
For a circular and price list address as above. 3 26*

MODELS, PATTERNS, EXPERIMENTAL and other Machinery, Models for the Patent Office, built to order by HOLSKE MACHINE CO., Nos. 528, 530, and 532 Water street, near Jefferson. Refer to SCIENTIFIC AMERICAN Office. 1 tf

MASON'S PATENT FRICTION CLUTCHES, for starting Machinery, especially Heavy Machinery, without sudden shock or jar, are manufactured by VOLNEY W. MASON,
14 tf] Providence, R. I.

R. BALL & CO.,
SCHOOL STREET, WORCESTER, MASS.,
Manufacturers of Woodworth's, Daniell's, and Gray & Wood's Planers, Sash Molding, Tenoning, Mortising, Upright and Vertical Shaping, Boring Machines, Scroll Saws, and a variety of other Machines and articles for working wood.
Send for our Illustrated Catalogue. 1 25*

PORTABLE STEAM ENGINES, COMbining the maximum of efficiency, durability, and economy with the minimum of weight and price. They are widely and favorably known, more than 600 being in use. All warranted satisfactory or no sale. Descriptive circulars sent on application. Address
J. C. HOADLEY & Co., Lawrence, Mass.

PLATINUM—For all Laboratory and Manufacturing purposes. Platinum Scrap and Ore purchased. H. M. RAYNOR, Office 748 Broadway, N. Y. 20 6*

FOR SALE—State, County, Town, and Shop Rights for the best Patent Cider Mill in the United States. Address H. SELLS, Vienna, C. W., or John Alexander, Shelby, Ohio. 19 6*

GRIST MILL AND FACTORY SITE near New York, for sale cheap. Address
15 tf] H. D. BEACH, Tom's River, N. J.

SPOKE AND HANDLE MACHINE,—For turning Spokes, Yankee Ax, Plow, Pick, Adze, and Hammer Handles, Whiffletrees, and irregular forms generally. Capacity 180 Spokes and 200 Hammer Handles per hour. For cut and description, address the Subscriber, Manufacturer and Patentee, at Warren, Trumbull county, Ohio. For Indiana address P. M. Benham, Fort Wayne. [19 8*] E. K. WISELL.

WOODWORTH PLANERS A SPECIALTY—From new patterns of the most approved style and workmanship. Wood-working Machinery generally. Nos. 24 and 26 Central, corner Union street, Worcester, Mass.
19 9* WITHERBY, RUGG & RICHARDSON.

KAVANAGH & DECKER'S
BILLIARD TABLES

THE TABLES MADE BY THIS FIRM are acknowledged by the best players to be superior to all others in durability and elegance of design and finish.
THE CATGUT CUSHION,
now so well known throughout the country, was patented Dec. 18, 1866. It is considered by all who have used it to be the nearest approach to a perfect cushion ever invented. All our tables are furnished with the catgut cushion.
Billiard stock in quantities to suit purchasers always on hand KAVANNAGH & DECKER,
172 Center street, cor. Canal, N. Y.,
and 601 and 603 Fourth street, cor. Washington avenue, St. Louis, Mo. 18 5

PATENT POWER AND FOOT-PUNCHING PRESSES, the best in market, manufactured by N. C. STILES & CO., West Meriden, Conn. Cutting and Stamping Dies made to order. Send for Circulars. [1413

SHAW & JUSTICE'S POWER HAMMER is Moderate in Price, is driven with one-tenth the power used by other Hammers, and will not cost the one hundredth part of what is usually spent in repairs. Its power is far in excess of any Hammer known. Manufactured by PHILIP S. JUSTICE,
14 North 5th street, Phila., and 42 Cliff-st., New York.
Shops 17th and Coates-sts., Philadelphia. 16 tf

FOR FIRST-CLASS SHAFTING WITH Patent Self-oiling Boxes and adjustable Hangers, also Mill Work and special machinery, address
16 tf] BULLARD & PARSONS, Hartford, Conn.

A Valuable Invention.—Double Action Wagon Brake. Patented Nov. 20, 1866. For State and County rights address [16 8*] I. M. GROSS, Easton, Pa.

WOOD & MANN STEAM ENGINE CO.'S CELEBRATED PORTABLE AND STATIONARY STEAM ENGINES AND BOILERS, from 1 to 35 horse-power. Also, PORTABLE SAW MILLS.
We have the oldest, largest, and most complete works in the United States, devoted exclusively to the manufacture of Portable Engines and Saw Mills, which, for simplicity, compactness, power, and economy of fuel, are conceded by experts to be superior to any ever offered to the public.
The great amount of boiler room, fire surface, and cylinder area, which we give to the rated horse-power, make our Engines the most powerful and cheapest in use; and they are adapted to every purpose where power is required.
All sizes constantly on hand, or furnished on short notice. Descriptive circulars, with price list, sent on application. WOOD & MANN STEAM ENGINE CO.
Utica, N. Y. Branch office 96 Maiden Lane N. Y. City.
1 32*

WOOD, LIGHT & CO.—MANUFACturers of Machinists' Tools and Naysmyth Hammers, Lathes from 4 to 30 feet long, and from 15 to [illegible] inches swing. Planers from 24 to 60 inches wide and from 4 to 46 feet long. Upright Drills. Milling and Index Milling Machines. Profiling or Edging Machines. Gun Barrel Machines Shafting, Mill Gearing, Pulleys and Hangers, with Patent Self-oiling Boxes.
Works, Junction Shop, Worcester, Mass.
Warehouse at 107 Liberty street, New York. 18 tf

PRESSURE BLOWERS—Equal in Force to Piston Blowers, and a perfect substitute for both Fan and Pistons—running more easily than either. Adapted for Blast, and Cupola, and Heating Purposes, Forges, Steamships, Boilers, Ventilation, etc., etc. Prices according to sizes, ranging from $25 to $1,500. Address, for Circular B. F. STURTEVANT,
13 tf] 72 Sudbury street, Boston, Mass.

SHEET AND ROLL BRASS.
German Silver, Brass, and Copper Wire, etc. Especia attention to particular sizes and widths for Machinists and Type Founders.
Manufactured by the THOMAS MANUFACTURING COMPANY, Thomaston, Conn. 1 24*

TAYLOR, BROTHERS & CO.'S BEST YORKSHIRE IRON.—This Iron is of a Superior Quality or locomotive and gun parts, cotton and other machinery, and is capable of receiving the highest finish. A good assortment of bars in stock and for sale by JOHN B. TAFT, sole agent for the United States and Canadas, No. 18 Batterymarch-st., Boston. 1 40*—R.

THE BEST POWER HAMMER MADE is the Dead Stroke Hammer of Shaw & Justice. Sizes suited for manufacturing awl blades or engine shafts; consume but little space, and require but little power. Manufactured by PHILIP S. JUSTICE,
14 North 5th street, Phila., and 42 Cliff-st., New York.
Shops 17th and Coates-sts., Philadelphia. 16 tf

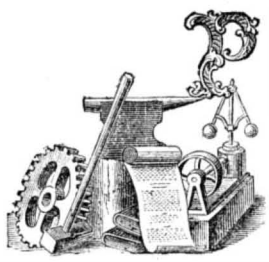
IRON PLANERS, ENGINE LATHES, Drills, and other Machinists' Tools, of Superior Quality, on hand and finishing. For Sale Low. For Description and Price, address NEW HAVEN MANUFACTURING CO., New Haven, Ct. 14 13*

LE COUNT'S IMPROVED HOLLOW LATHE DOG is light, equal in strength to Steel, at one sixth the cost. Set of 12 Dogs, from ⅜ to 4 inches, $17.30. Also, Hollow Machinists' Clamps. Can be had of all dealers. Send for circular.
16 8*tf.] C. W. LE COUNT, South Norwalk, Conn.

OIL! OIL!! OIL!!!
For Railroads, Steamers, and for machinery and Burning, PEASE'S Improved Engine Signal, and Car Oils, indorsed and recommended by the highest authority in the United States and Europe. This Oil possesses qualities vitally essential for lubricating and burning, and found in no other oil. It is offered to the public upon the most reliable, thorough, and practical test. Our most skillful engineers and machinists pronounce it superior to and cheaper than any other, and the only oil that is in all cases reliable and will not gum. The "Scientific American", after several tests, pronounces it "superior to any other they have used for machinery." For sale only by the Inventor and Manufacturer, F. S. PEASE, No 61 and 63 Main street, Buffalo N. Y.
N. B.—Reliable orders filled for any part of the world
1 tf

© 1867 SCIENTIFIC AMERICAN, INC

PATENTS



The First Inquiry that presents itself to one who has made any improvement or discovery is: "Can I obtain a Patent?" A *positive* answer can only be had by presenting a complete application for a Patent to the Commissioner of Patents. An application consists of a Model, Drawings, Petition, Oath, and full Specification. Various official rules and formalities must also be observed. The efforts of the inventor to do all this business himself are generally without success. After a season of great perplexity and delay, he is usually glad to seek the aid of persons experienced in patent business, and have all the work done over again. The best plan is to solicit proper advice at the beginning.

If the parties consulted are honorable men, the inventor may safely confide his ideas to them: they will advise whether the improvement is probably patentable, and will give him all the directions needful to protect his rights.

Messrs. MUNN & CO., in connection with the publication of the SCIENTIFIC AMERICAN, have been actively engaged in the business of obtaining patents for over twenty years—*nearly a quarter of a century.* Over Fifty thousands inventors have had benefit from our counsels. More than one third of all patents granted are obtained by this firm.

Those who have made inventions and desire to consult with us, are cordially invited to do so. We shall be happy to see them in person, at our office, or to advise them by letter. In all cases they may expect from us an *honest opinion.* For such consultations, opinion, and advice, *we make no charge.* A pen-and-ink sketch, and a description of the invention should be sent, together with stamps for return postage. Write plainly, do not use pencil nor pale ink; be brief.

All business committed to our care, and all consultations, are kept by us *secret and strictly confidential.* Address MUNN & CO., 37 Park Row, New York.

In Order to Apply for a Patent, the law requires that a model shall be furnished, not over a foot in any dimensions,—smaller, if possible. Send the model by express, pre-paid, addressed to Munn & Co., 37 Park Row, N. Y., together with a description of its operation and merits. On receipt thereof we will examine the invention carefully and advise the party as to its patentability, free of charge.

The model should be neatly made of any suitable materials, strongly fastened, without glue, and neatly painted. The name of the inventor should be engraved or painted upon it. When the invention consists of an improvement upon some other machine, a full working model of the whole machine will not be necessary. But the model must be sufficiently perfect to show, with clearness, the nature and operation of the improvement.

New medicines or medical compounds, and useful mixtures of all kinds, are patentable.

When the invention consists of a medicine or compound, or a new article of manufacture, or a new composition, samples of the article must be furnished, neatly put up. Also, send us a full statement of the ingredients, proportions, mode of preparation, uses, and merits.

Preliminary Examination.—In order to obtain a Preliminary Examination, make out a written description of the invention in your own words, and a rough pencil or pen-and-ink sketch. Send these with the fee of $5 by mail, addressed to MUNN & CO., 37 Park Row, and in due time you will receive an acknowledgment thereof, followed by a written report in regard to the patentability of your improvement. The Preliminary Examination consists of a special search, which we make with great care, among the models and patents at Washington to ascertain whether the improvement presented is patentable.

Quick Applications.—When, from any reason, parties are desirous of applying for Patents or Caveats, in GREAT HASTE, without a moment's loss of time, they have only to write or telegraph us specially to that effect, and we will make special exertions for them. We can prepare and mail the necessary papers at less than an hour's notice, if required.

Reissues.—A reissue is granted to the original patentee, his heirs, or the assignees of the entire interest, when by reason of an insufficient or defective specification the original patent is invalid, provided the error has arisen from inadvertence, accident, or mistake, without any fraudulent or deceptive intention.

A patentee may, at his option, have in his reissue a separate patent for each distinct part of the invention comprehended in his original application, by paying the required fee in each case, and complying with the other requirements of the law, as in original applications.

Each division of a reissue constitutes the subject of a separate specification descriptive of the part or parts of the invention claimed in such division; and the drawing may represent only such part or parts. Address MUNN & CO., 37 Park Row, for full particulars.

Caveats.—A Caveat gives a limited but immediate protection, and is particularly useful where the invention is not fully completed, or the model is not ready, or further time is wanted for experiment or study. After a Caveat has been filed, the Patent Office will not issue a patent for the same invention to any other person, without giving notice to the Caveator, who is then allowed three months time to file in an application for a patent. A Caveat, to be of any value, should contain a clear and concise description of the invention, so far as it has been completed, illustrated by drawings when the object admits. In order to file a Caveat the inventor needs only to send us a letter containing a sketch of the invention, with a description in his own words. Address MUNN & CO., 37 Park Row, N. Y.

Additions can be made to Caveats at any time. A Caveat runs one year, and can be renewed on payment of $10 a year for as long a period as desired.

Interferences.—When each of two or more persons claims to be the first inventor of the same thing, an "Interference" is declared between them, and a trial is had before the Commissioner. Nor does the fact that one of the parties has already obtained a patent prevent such an interference; for, although the Commissioner has no power to cancel a patent already issued, he may, if he finds that another person was the prior inventor, give him also a patent, and thus place them on an equal footing before the courts and the public

Foreign Patents.—American Inventors should bear in mind that, as a general rule, any invention that is valuable to the patentee in this country is worth equally as as much in England and some other foreign countries. Five Patents—American, English, French, Belgian, and Prussian—will secure an inventor exclusive monopoly to his discovery among ONE HUNDRED AND THIRTY MILLIONS of the most intelligent people in the world. The facilities of business and steam communication are such that patents can be obtained abroad by our citizens almost as easily as at home. The majority of all patents taken out by Americans in foreign countries are obtained through the SCIENTIFIC AMERICAN PATENT AGENCY. A Circular containing further information and a Synopsis of the Patent Laws of various countries will be furnished on application to Messrs. MUNN & CO.

For Instructions concerning Foreign Patents, Reissues, Interferences, Hints on Selling Patents, Rules and Proceedings at the Patent Office, the Patent Laws, etc., see our Instruction Book. Sent free by mail on application. Those who receive more than one copy thereof will oblige by presenting them to their friends.

Address all communications to

MUNN & CO.,

No. 37 Park Row, New York City.
Office in Washington, Cor. F and 7th streets.

Patents are Granted for Seventeen Years, following being a schedule of fees:—

On filing each Caveat	$10
On filing each application for a Patent, except for a design	$15
On issuing each original Patent	$20
On appeal to Commissioner of Patents	$20
On application for Reissue	$30
On application for Extension of Patent	$50
On granting the Extension	$50
On filing a Disclaimer	$10
On filing application for Design (three and a half years)	$10
On filing application for Design (seven years)	$15
On filing application for Design (fourteen years)	$30

In addition to which there are some small revenue-stamp taxes. Residents of Canada and Nova Scotia pay $500 on application.

CITY SUBSCRIBERS.—The SCIENTIFIC AMERICAN will be delivered in every part of the city at $4 a year. Single copies for sale at all the News Stands in this city, Brooklyn, Jersey City, and Williamsburg, and by most of the News Dealers in the United States.

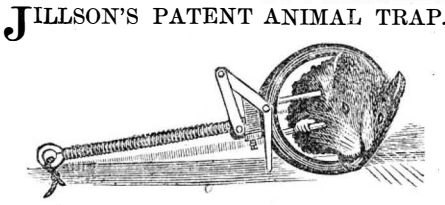
PATENT CLAIMS.—Persons desiring the claim of any invention, patented within thirty years, can obtain a copy by addressing a note to this office, giving name of patentee and date of patent, when known, and inclosing $1 as a fee for copying. We can also furnish a sketch of any patented machine to accompany the claim, at a reasonable additional cost. Address MUNN & CO. Patent Solicitors, No. 37 Park Row, New York.

RECEIPTS.—When money is paid at the office for subscriptions, a receipt for it will be given; but when subscribers remit their money by mail, they may consider the arrival of the first paper a *bona-fide* acknowledgment of their funds.

Advertisements.

A limited number of advertisements will be admitted in this page on the following terms:—Seventy-five cents a line, each insertion, for solid matter; one dollar a line for space occupied by engravings.

JILLSON'S PATENT ANIMAL TRAP.



The cheapest and best trap ever used for catching Rats, Gophirs, Squirrels, etc. One trial is sufficient to satisfy any one of its superiority over all others. Price $3 per doz.; $33 per gross. Sample trap sent by mail, postage paid, upon receipt of 50 cents. Sole Proprietors and Manufacturers, DODGE & WELLINGTON, Worcester, Mass.

ENQUIRE OF THE MILLBURY MACHINE COMPANY For Engine and Drilling Lathes, also, Chucking and Boring Machines, all kinds of Shafting, Hangers and Pullies, Trip Hammers, Independent Chucks. All kinds of Mill Gearing built to order. Millbury, Mass.

PATTERN LETTERS To put on Patterns, for castings. KNIGHT BROS., Seneca Falls, N. Y. 22 6*

GRINDING MILLS—Cheapest and Best in the world. Burr Stones from 8 inches to 4 feet. 22 4*os] EDWARD HARRISON, New Haven, Ct.

A GREAT CHANCE.—The whole or half interest of a valuable patent for sale CHEAP. Already established. Is bound to become as universal as the clothes we wear. Will guarantee to an energetic man $10,000. No capital required. Apply soon to T. S. LAMBORN, 21 2*] Marshalton, Chester co., Pa.

HOWE'S STANDARD SCALES.

Every description of Scale warranted to give entire satisfaction. Send for a catalogue and circular. Second-hand Scales of other makers for sale cheap. FRANK E. HOWE & BROTHER, 3 Park Place, First Store from Broadway, New York.

LARGE AND ENDURING WATER POWER FOR SALE, for Improvement, on Rock River, at Coloma, Whiteside Co., Ill., opposite the city of Sterling. This Power, with its surrounding country and Railroad and River communication, affords one of the best opportunities in the country for manufacturing of all kinds, and every possible encouragement will be given for its improvement. Address A. P. SMITH, Sterling, Ill. 22 tf

FOR SALE—A Grist Mill in New Jersey, 60 miles from New York, with two new dwellings, barn, horse shed, wood sheds and out-buildings, 1½ acres of Cranberry land in full bearing, and 101 acres of ground additional, part cleared and part of which has valuable standing cedar. Price $8000. Apply to H. D. BEACH, 22 3] Sun Office, cor. Fulton and Nassau sts., N. Y.

IMPORTANT. MOST VALUABLE MACHINE for all kinds of irregular and straight work in wood, called the Variety Moulding and Planing Machine, indispensable to competition in all branches of wood-working. Our improved guards make it safe to operate. Combination collars for cutters, saving 100 per cent, and feed table and connection, for waved moldings and planing, place it above all others. Evidence of the superiority of these machines is the large numbers we sell, in the different states, and parties laying aside others and purchasing ours, for cutting and shaping irregular forms, sash work, etc.

We hear there are manufacturers infringing on some one or more of our nine patents in this machine. We caution the public from purchasing such.

All communications must be addressed "Combination Molding and Planing Machine Company, Post-office Box 3230, New York. All our machines are tested before delivery, and warranted.

Send for descriptive pamphlet. Agents solicited. [14 13*

BUERK'S WATCHMAN'S TIME DETECTOR.—Important for all large Corporations and Manufacturing concerns—capable of controlling with the utmost accuracy the motion of a watchman or patrolman, as the same reaches different stations of his beat. Send for a Circular. J. E. BUERK, P. O. Box 1,057, Boston, Mass.

N. B.—This detector is covered by two U. S. patents. Parties using or selling these instruments without authority from me will be dealt with according to law. 16 19*

CIRCULAR SAWS,

WITH

EMERSON'S PATENT MOVABLE TEETH.

These Saws cut More and Better Lumber in the same time, and with Less Power, than any other Saw in the world, with Less Expenditure of Labor and Files to keep in order, and never Wear Smaller. Also

EMERSON'S PATENT GAUGING AND SHARPENING SWAGE,

For Spreading the Points of Saw Teeth. Send for New Descriptive Pamphlet, with Price List.

AMERICAN SAW COMPANY,
2 Jacob street, near Ferry street, New York. 19

MATERIALS FOR MACHINISTS; INVENTORS, and MODEL MAKERS.—Sheet Steel, Sheet Brass, Brass, Copper, Iron, and Steel Wire, Brass Tube, Spring Brass Wire, and Small Tool Steel. Any of the above materials cut in quantities to suit. Machine Screws by the dozen or gross. 22 2] D. GOODNOW, JR., Boston, Mass.

LINDSAY'S Patent SCREW WRENCH. —*THREE TIMES THE STRENGTH WITHOUT ADDITIONAL WEIGHT.*—Call at the nearest Hardware Store and look at it, or send for circular to 21 13 os] MANVEL & LINDSAY, New York.

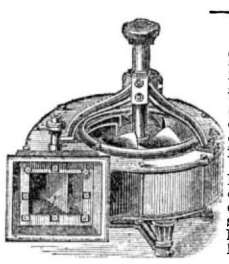
PLATINA POINTS,—For Lightning Rods, Glass Insulators, Staples, Connections, etc., etc., of our Celebrated Make. A Priced List sent free on application. WM. Y. MCALLISTER. 21 2 os] 728 Chestnut street, Philadelphia, Pa.

$45 WILL BUY A PERFECT SET of the Scientific American, Vol. 1 to Vol. 16, New Series, nearly new $60 bound. The first twelve Vols. will be sold in a separate lot if desired. Address 21 tf] STREBOR, Box 773, N. Y. P. O.

LAW'S PATENT SHINGLE and HEADING MACHINE—The simplest and best in use. Stave Cutters, Jointers, Equalizers, etc. Send for illustrated circular. Address TREVOR & CO., 21 4* Lockport, N. Y.

ENGINEERS' TRANSITS—RAILROAD TRANSITS, ENGINEERS' LEVELS, SURVEYORS' COMPASSES, Tripods. Surveying Chains, Chesterman's Metallic and Steel Tape Measures, Slepe Levels, Lockes' Hand Levels, etc., etc. Swiss Instruments, Mathematical Instruments, Standard Rules, etc., etc. A priced and Illustrated Catalogue sent free by mail on application. WM. Y. MCALLISTER, 21 2 os] 728 Chestnut street, Philadelphia, Pa.

TURBINE WATER WHEELS.



The REYNOLDS PATENT embodies the progressive spirit of the age. Simplicity, Economy, Durability, Accessibility all combined. The only Turbine that excels Overshots. Awarded the Gold Medal by American Institute.

Shafting, Gearing and Pulleys furnished for all kinds of Mills, made on Mechanical Principles, under my personal supervision, having had long experience. Circulars sent free.

GEORGE TALLCOT,
17 13*tf—H] No. 96 LIBERTY STREET, NEW YORK.

PRINTING.—CARDS, CIRCULARS, Bill heads, Pamphlets, Newspapers, and every description of printing executed neatly and with dispatch. Also, Electrotyping and Stereotyping, and orders for Designing and Wood Engraving promptly attended to by MACDONALD & CO., 21 37 Park Row, (Room 40,) New York.

LUMBER can be Seasoned in from Two to Four Days, by Bulkley's Patent, at an average cost of $1 per M. For circulars, with information, address, C. H. BULKLEY No. 2 Case Building, Cleveland, O. 21 3os*]

EUROPEAN AGENCY for the Exhibition and Sale of American Patents and Manufactures. BLANCHARD & MCKEAN. No. 82 Boulevard de Sebastopol Paris, France GEO. A. BLANCHARD.] 10 os13* [J. A. MCKEAN.

SQUEAKING BOOTS Cured for twenty-five cts. Address A, Box 481 Providence, R. I.

FOOT LATHES Manufactured by 22 3*] C. F. ROST, 328 and 330 Delancy st., N. Y.

Anti-Incrustation Powder of H. N. Winans, 11 Wall st., N. Y., a positive prevention of scale. 223*

TWIST DRILLS AND CHUCKS—All the most improved kinds, for sale by 22 2] D. GOODNOW, JR., Boston, Mass.

WATER WHEELS! Water Wheels!!—The Best in Use! Manufactured by VALENTINE & CO., Ft. Edward, N. Y. Circulars gratis. 22 7

FOR SALE—A 30-Horse Steam Engine in perfect running order. Price $1,700. Paterson Iron Co., Paterson, N. J. 1*

$18.00 A DAY.—Agents wanted, male and female, to introduce a new article of household utility. Only Five Dollars Capital Required. Particulars free. Address W. A. HENDERSON & CO., Cleveland, Ohio. 22 13—R.

HAND TOOLS For Turning Brass, Iron, Ivory, and Hard Wood. Price $2.50 per set of 12 different shapes. D. GOODNOW, JR., 22 2] Boston, Mass.

PHOENIX IRON WORKS—Established 1834. GEO. S. LINCOLN & CO., Iron Founders and Manufacturers of Machinists' Tools 54 to 60 Arch street, Hartford, Conn.

We are prepared to furnish first-class Machinists' Tools on short notice. Samples may be seen in our Wareroom. Also, we keep constantly on hand our Patent FRICTION PULLEY, Counter Shafts for Lathes, etc. 21 tf

STEAM. STEAM. STEAM. THE

HARRISON BOILER,

having had a practical test for more than three years past among nearly every class of enterprise or work employing steam, and to an extent of power varying from 10 to 300 horses, is presented as embracing the following advantages:

It is absolutely Free from Destructive Explosion.

It has no superior in saving fuel.

It is a rapid steam generator, and if required is made its own superheater without extra apparatus.

It is easily transportable, and may be passed in sections through an ordinary doorway.

It may be enlarged to any required size without disturbing parts already erected.

It is safe from all incrustation, or any of the evils arising therefrom.

It is compact, neat and cleanly, and easily managed.

Nearly 300 of these boilers are in practical use.

The extensive introduction of this boiler in Philadelphia, where the works are situated, has induced its proprietor, JOSEPH HARRISON, Esq., to establish a branch office in this city, where circulars may be procured, a model be seen, and all information respecting it be obtained at Rooms Nos. 9 and 10 No. 119 Broadway, corner Cedar street. [22 tf] J. B. HYDE, Agent.

STEAM ENGINES—OF ANY POWER desired for manufactories, of superior construction, with patent frictionless slide valve and variable expansion. Address M. & T. SAULT, New Haven, Conn. 11 23*tf

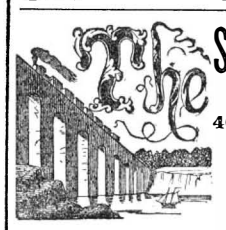
GROVER & BAKER'S HIGHEST PREMIUM ELASTIC Stitch Sewing Machines, 495 Broadway, N. Y. 1 tf

LATHE CHUCKS—HORTON'S PATENT—from 4 to 24 inches. Manufacturer's address, E. HORTON & SON, Windsor Locks, Conn. 5 25*.

ERICSSON CALORIC ENGINES OF GREATLY IMPROVED CONSTRUCTION.—Ten years of practical working by the thousands of these engines in use, have demonstrated beyond cavil their superiority where less than ten horse-power is required. Portable and Stationary Steam Engines, Grist and Saw Mills, Cotton Gins' Air Pumps, Shafting, Pulleys, Gearing Pumps, and General Jobbing. Orders promptly filled for any kind of Machinery. JAMES A. ROBINSON, 1 tf—D] 164 Duane street, cor. Hudson, New York.

1866.—TOPLIFF'S PATENT PERPETUAL LAMP WICK, received First Premium at N. Y. State Fair, and special premium, Book of Transactions. Needs no trimming. Rare inducements to Agents. Sample sent for 20 cents; two for 30 cents. MURPHY & COLE, 81 Newark ave., Jersey City. 3 tf 6

$25 A DAY! Fifteen new articles for Agents. [11 13*N.] O. T. GAREY, Biddeford, Me.



The Scientific American.

4000 Book Pages a Year.

THE **BEST NEWSPAPER** IN THE WORLD.

This paper differs materially from other publications being an Illustrated Periodical, devoted to the promulgation of information relating to the various Mechanical and Chemical Arts, Photography, Manufactures, Agriculture, Patents, Inventions, Engineering, Mill Work, etc.

Every number of the SCIENTIFIC AMERICAN contains sixteen large pages of reading matter, abundantly illustrated.

All the most valuable discoveries are delineated and described in its issues; so that, as respects inventions, it may be justly regarded as an Illustrated Repertory, where the Inventor may learn what has been done before him in the same field which he is exploring, and where he may bring to the world a knowledge of his own achievements.

The contributors to the SCIENTIFIC AMERICAN are among the most eminent scientific and practical men of the times.

Mechanics, Inventors, Engineers, Chemists, Manufacturers, Agriculturists, and people in every profession of life, will find the SCIENTIFIC AMERICAN to be of great value in their respective callings. Its counsels and suggestions will save them hundreds of dollars annually, besides affording them a continual source of knowledge, the value of which is beyond pecuniary estimate.

An official list of all Patents granted, together with the claims thereof, is published weekly.

The form of the SCIENTIFIC AMERICAN is adapted for binding and preservation; and the yearly numbers make a splendid volume of nearly one thousand quarto pages, equivalent to nearly four thousand ordinary book pages.

Published Weekly, $3 a year, $1,50 half year, 10 copies for 1 year, $25. Specimen copies sent gratis. Address

MUNN & CO.,
No. 37 Park Row, New York.

© 1867 SCIENTIFIC AMERICAN, INC